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SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 17 IN SET 264

Silvertone Models 5100, 5106, 5110, 5114, 5116, 5126, A, 5128 and 5130 were covered in Photofact Folder 17 – Set 264.

Several new models and chassis have been added to this group. A complete list of models and chassis is given below.

MODELS	CHASSIS	MODELS	CHASSIS
4103	528.34700	5116D	528.34501
4109	528.34800	5124	528.34100
5100, 5101	528.31300	5126	528.31401
5100A	528.33000	5126A	528.32800
5106	528.31700	5126B	528.32800
5106	528.31701	5126C	528.34100
5106A	528.33100	5128	528.31800
5106B	528.33100	5128B	528.32900
5110	528.31400	5128C	528.34500
5110	528.31401	5128D	528.34501
5110A	528.32800	5130	528.31801
5110C	528.34100	5130B	528.32900
5114	528.31800	5130C	528.34500
5114B	528.32900	5130D	528.34501
5114C	528.34500	41102	528.32800
5114D	528.34501	41282A	528.32900
5116	528.31800	41302A	528.32900
5116B	528.32900		528.34502
5116C	528.34500		528.34503

SILVERTONE CHASSIS 528.31300, 528.31400, 528.31401, 528.31700, 528.31701, 528.31800, 528.31801, 528.32800, 528.32900, 528.33000, 528.33100, 528.34100, 528.34500, 528.34501, 528.34502, 528.34503, 528.34700, 528.34800

Ch. 528.32900

Chassis 528.32900 is identical to chassis 528.32800, except for the following.

A cascode tuner (part #T95-43) is used. A schematic of this tuner is given on the reverse side.

R47 is increased from 220Ω to 330Ω.

C43 is increased from 220MMF to 560MMF.

R44 is decreased from 39KΩ to 33KΩ.

R56 is increased from 22KΩ to 39KΩ.

R92 is increased from 2.1KΩ to 2.5KΩ.

R79 is decreased from47KΩ to 39KΩ.

C71 and R95 are omitted.

Picture tube changed to 21XP4.

Deflection yoke changed to part #T10-682.

PRODUCTION CHANGES
BULLETIN 122

PRODUCTION CHANGES
BULLETIN 122

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SILVERTONE CHASSIS 528.33300, 528.31400, 528.31401, 528.31700, 528.31701, 528.31800, 528.31801, 528.32800, 528.32900, 528.33000, 528.33100, 528.34100, 528.34500, 528.34501, 528.34502, 528.34503, 528.34700, 528.34800

Ch. 528.33000	Chassis 528.33000 is identical to chassis 528.32800, except the picture tube is changed to a 17HP4.
Ch. 528.33100	Chassis 528.33100 is identical to chassis 528.32900, except the picture tube is changed to a 17HP4.
Ch. 528.34000	Chassis 528.34000 is identical to chassis 528.32900, except the picture tube is changed to a 21YP4.
Ch. 528.34100	Chassis 528.34100 is identical to chassis 528.32800, except the picture tube is changed to a 21YP4.
Ch. 528.34500	Chassis 528.34500 is identical to chassis 528.32900, except the picture tube is changed to a 21AVP4.
Ch. 528.34700, 528.34800	Chassis 528.34700 and 528.34800 are identical to chassis 528.32800, except for the following: The deflection yoke changed to part #T10-692. The physical location of C1 and C2 have been reversed.
Ch.528.34501	Chassis 528.34501 is identical to chassis 528.32900, except the picture tube is changed to a 21AVP4A.
Ch.528.34502, 528.34503	Deflection yoke changed to part #T10-696. With this change, chassis 528.34500 becomes chassis 528.34502 and chassis 528.34501 becomes chassis 528.34503.

HALLICRAFTERS MODELS 17T310B, 17T310M, 17T310W

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 7 IN SET 253
Hallicrafters models 17T310B, M and W were covered in Photofact Folder 7 - Set 253. In Run 2 the following changes were made. C4 (20MFD, 450V., electrolytic) is reduce to a 10MFD, 450V., electrolytic. C1 (140MFD, 300V., electrolytic is increased to a 200MFD, 150V., electrolytic. L13 (part #51A1855) wound on a 4.7KΩ resistor is now wound on a 15KΩ resistor, new part #51A1875. L14 (part #51A1856) wound on a 27KΩ resistor is now wound on a 68KΩ resistor, new part #51A1876. A 5000MMF, 1000V., disc ceramic capacitor is added in parallel with R78 (picture tube mounting bracket to ground. A .01MFD, 500V., molded paper capacitor is added from pin 5 of V13 (damper) to ground. A 33MMF, 500V., ceramic tubular capacitor is added from pin 1 of V7B (sync amplifier) to ground.

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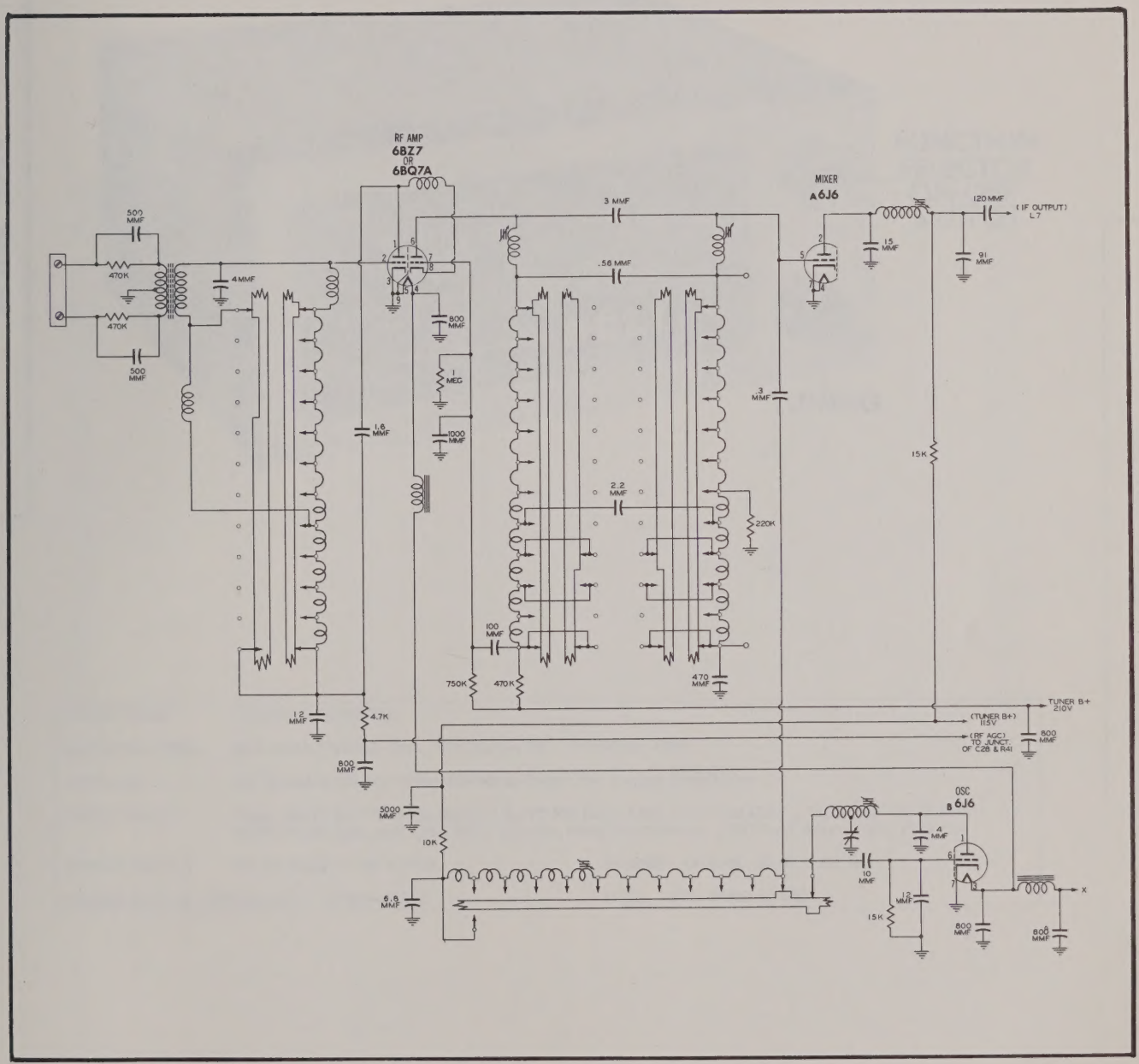

BELL SOUND MODEL 2255

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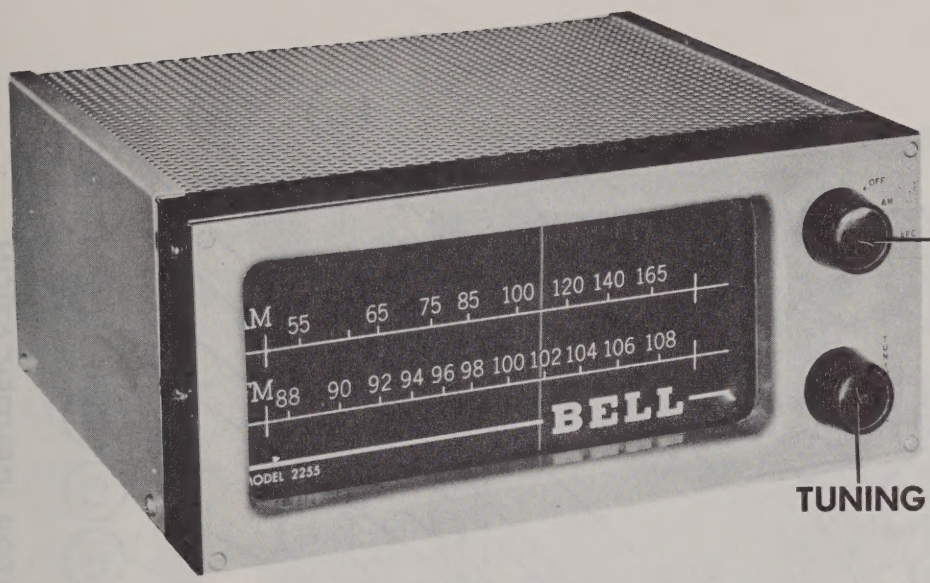
BELL SOUND MODEL 2255



BELL SOUND MODEL 2255

TRADE NAME	Bell Sound Model 2255	
MANUFACTURER	Bell Sound Systems, Inc., 555 Marion Rd., Columbus, Ohio	
TYPE SET	AC Operated AM-FM Superheterodyne Tuner For Custom Installation	
TUBES (Eight)	Types 12AT7 FM RF Amp.-Mixer, 12AT7 FM Osc.-AFC, 6BE6 AM Conv., 6BA6 FM-AM IF Amp., 6AU6 FM IF Amp.-AM Det., 6AU6 Limiter, 6AL5 Discriminator, 12AU7 AF Amp.-Cath. Follower	
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING .26 Amp. @ 117 Volts AC
TUNING RANGE - BROADCAST	530KC-1650KC	FREQ. MOD. 88MC-108MC

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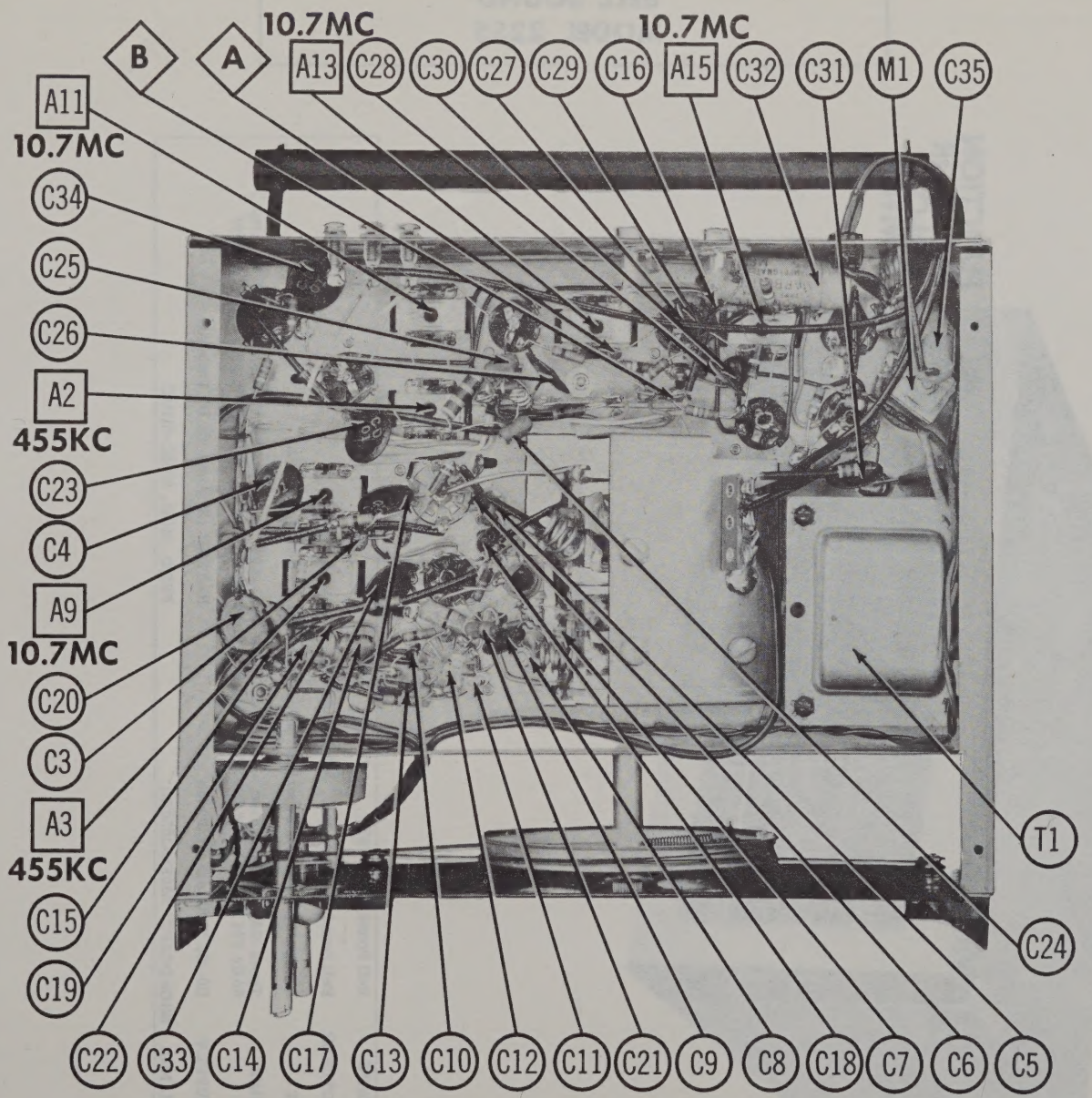
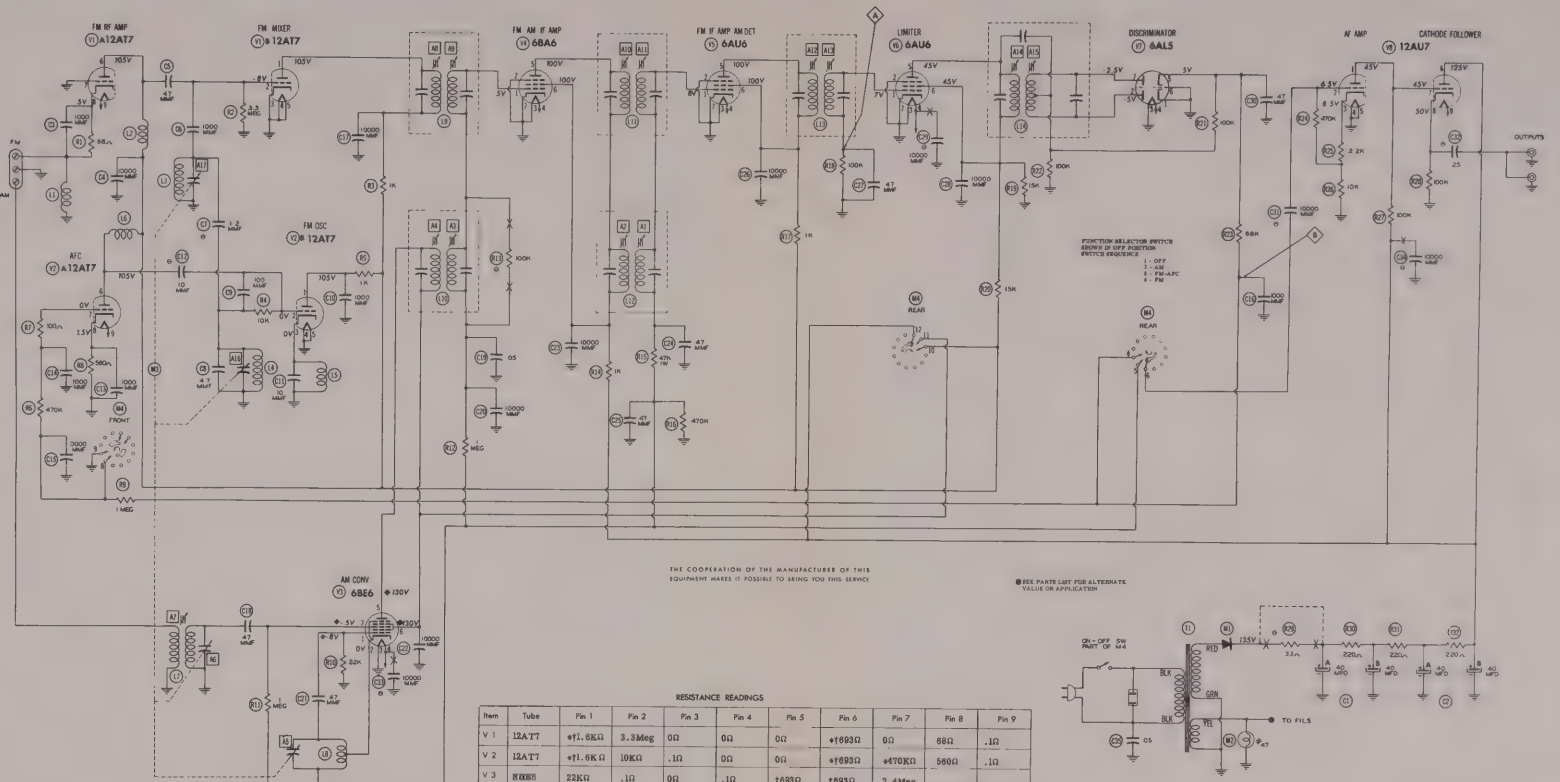


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION


FM RF AMP V1 A 12AT7
FM MIXER V1 B 12AT7
FM OSC V2 B 12AT7
AFC V2 A 12AT7
FM AM IF AMP V4 6BA6
FM IF AMP AM DET V5 6AU6
LIMITER V6 6AU6
DISCRIMINATOR V7 6AL5
AF AMP V8 12AU7
CATHODE FOLLOWER
AM CONV V3 6BE6
FM
AM
OUTPUTS
FUNCTION SELECTOR SWITCH SHOWN IN OFF POSITION
SWITCH SEQUENCE
1 - OFF
3 - AM
5 - FM-AFC
4 - FM
M4 REAR
M4 FRONT
THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
ON-OFF SW PART OF M4
TO FILS

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AT7	♦†1.6KΩ	3.3Meg	0Ω	0Ω	0Ω	♦†693Ω	0Ω	68Ω	.1Ω
V 2	12AT7	♦†1.6KΩ	10KΩ	.1Ω	0Ω	0Ω	♦†693Ω	♦470KΩ	560Ω	.1Ω
V 3	6BE6	22KΩ	.1Ω	0Ω	.1Ω	†693Ω	†693Ω	2.4Meg		
V 4	6BA6	1.5Meg	0Ω	0Ω	.1Ω	♦†1.6KΩ	♦†1.6KΩ	0Ω		
V 5	6AU6	5.1KΩ	0Ω	0Ω	.1Ω	♦†1.6KΩ	♦†1.6KΩ	0Ω		
V 6	6AU6	100KΩ	0Ω	0Ω	.1Ω	♦†15.6KΩ	♦†15.6KΩ	0Ω		
V 7	6AL5	0Ω	100KΩ	0Ω	.1Ω	200KΩ	0Ω	100KΩ		
V 8	12AU7	†100KΩ	480KΩ	13.2KΩ	0Ω	0Ω	†693Ω	†100KΩ	100KΩ	.1Ω

ALL MEASUREMENTS WITH SELECTOR SWITCH IN AM POSITION UNLESS OTHERWISE STATED.
♦ MEASURED IN AM POSITION
† MEASURED FROM OUTPUT OF M1

1. DC voltage measurements taken with vacuum tube voltmeter.
AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings. Tolerance of resistor component values makes possible a variation of ±10% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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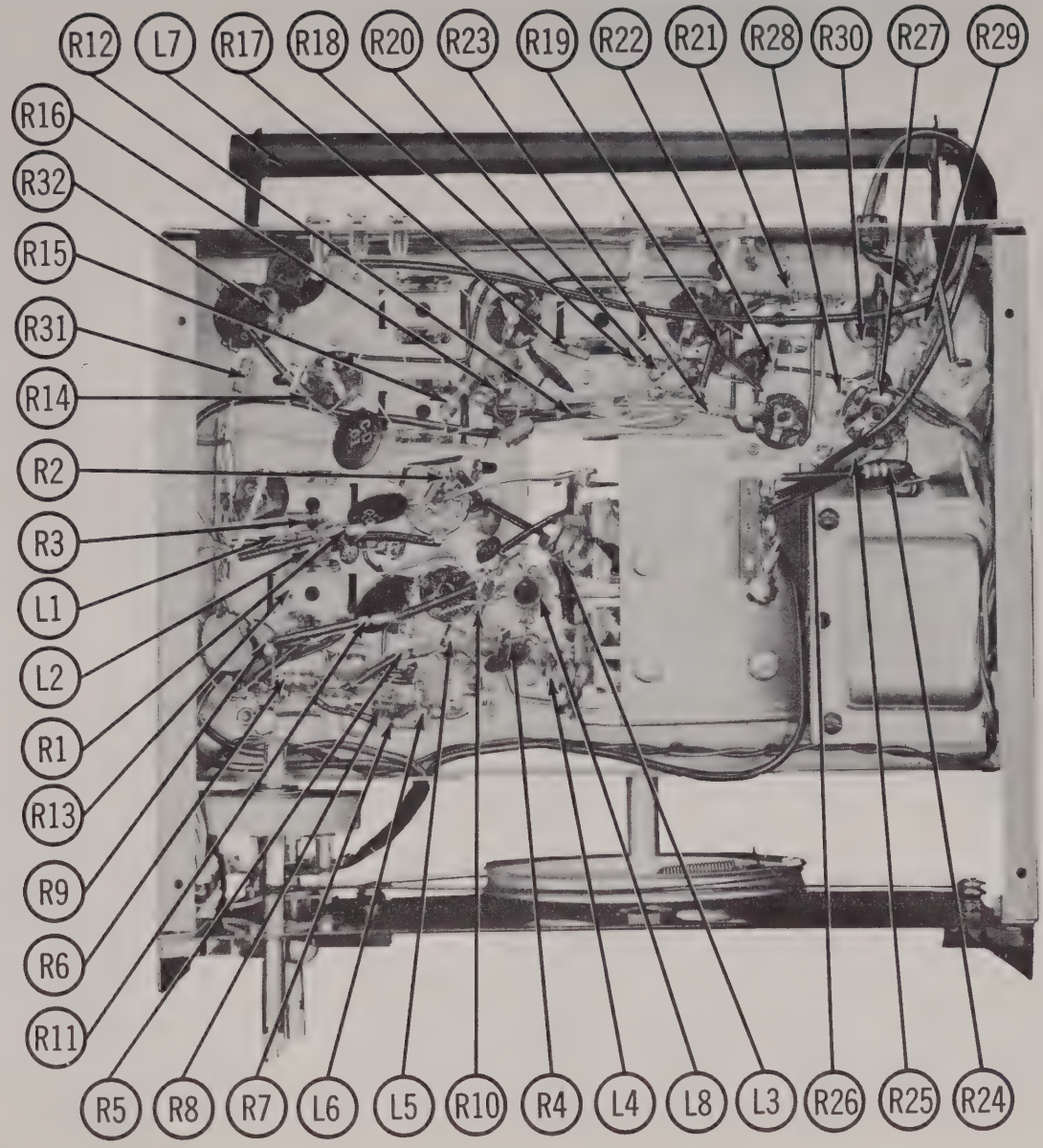
276-2



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
[illegible] MEADE ST.
[illegible], COLORADO

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Allow 15 minute warm-up period for tuner and equipment.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (grid) of 6BE6 (V3). Low side to chassis.	455KC (400∿Mod)	AM	Point of non-interference	Across audio Output Jack	A1, A2, A3, A4	Adjust for maximum deflection.
2.	220MMF	High side to antenna terminal lug. Low side to chassis.	1500KC	"	1500KC	"	A5, A6	"
3.		"	600KC	"	600KC	"	A7	Adjust for maximum deflection while rocking tuning gang.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	.01MFD	High side to pin (grid) of 6BA6 (V4). Low side to chassis.	10.7MC (Unmod)	FM	Point of non-interference	DC probe thru 100KΩ to point Ⓐ. Common to chassis.	A8, A9, A10, A11, A12, A13	Adjust for maximum deflection.
5.	"	"	"	"	"	DC probe to point Ⓑ. Common to chassis.	A14, A15	"

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	.01MFD	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	10.7MC (Unmod)	FM	Point of non-interference	Vert. Amp. thru 100KΩ to point Ⓐ. Low side to chassis.	A8, A9, A10, A11, A12, A13	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1
5.	"	"	"	"	"	Vert. Amp. to point Ⓑ. Low side to chassis.	A14, A15	Adjust A15 so that 10.7MC occurs at center of crossover lines similar to Fig. 2. Adjust A14 for maximum amplitude and straightness of cross-over lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	270Ω Carbon Resistors	Across FM antenna terminals with 270Ω in each lead.	106MC	FM	106MC	DC probe to point Ⓐ. Common to chassis.	A16, A17	Adjust for maximum deflection.
7.	"	"	90MC	"	90MC	"	L3, L4	Compress or expand L3 and L4 for maximum deflection.

FIG. 1

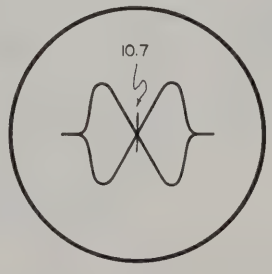


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		Bell Sound PART No.	STANDARD REPLACEMENT		
V1	FM RF Amp.-				
	FM Mixer	12AT7	12AT7	9A	
V2	FM Osc.-AFC	12AT7	12AT7	9A	
V3	AM Converter	6BE6	6BE6	7CH	
V4	FM-AM IF Amp.	6BA6	6BA6	7BK	
V5	FM IF Amp.-				
	AM Detector	6AU6	6AU6	7BK	
V6	Limiter	6AU6	6AU6	7BK	
V7	Discriminator	6AL5	6AL5	6BT	
V8	AF Amp.-				
	Cathode Follower	12AU7	12AU7	9A	

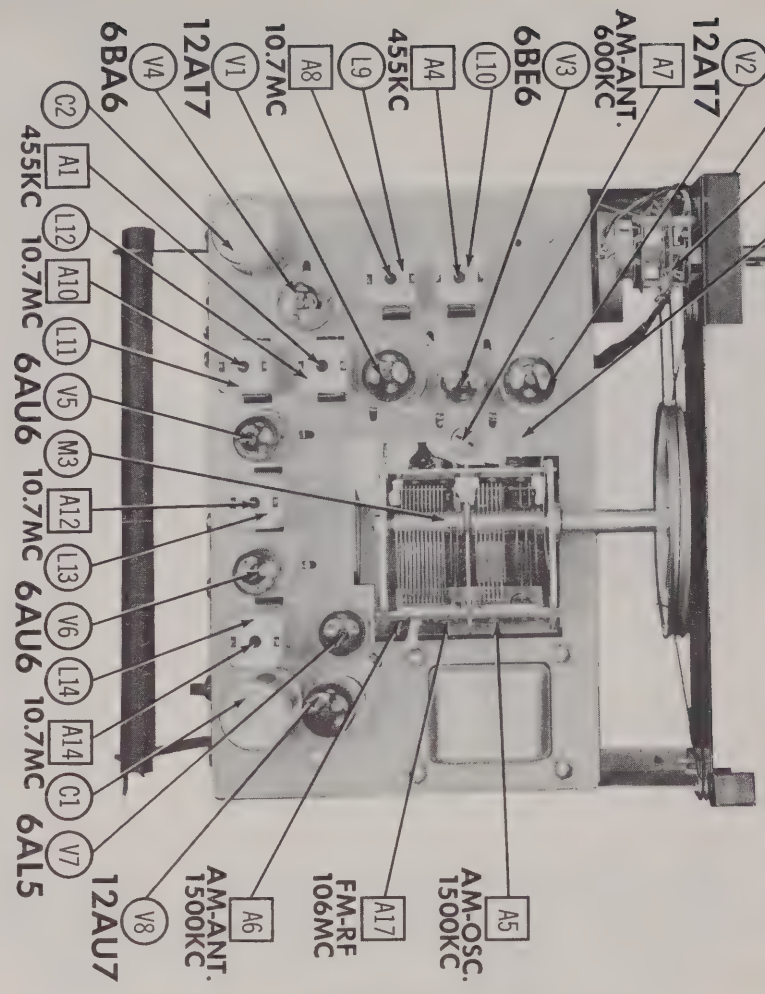
CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	Bell Sound PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	■40	150				FP212	TM-D40-150	D-060	
B	▲40	150							
C2A	40	150				FP212	TM-D40-150	D-060	
B	40	150							
C3	1000			DD-102	801-001	DC-521			
C4	10000			DD-103	811-01	DC-511			
C5	47			D6-470	GP1K-470	UC-5447			
C6	1000			DD-102	801-001	DC-521			
C7	1.2			TCZ-1.2	NP0A-1R2				Note 1
C8	4.7			TCZ-4.7	NP0A-4R7	ZT-555			
C9	100			TCN-100	N750L-101	NT-531			
C10	1000			DD-102	801-001	DC-521			
C11	10			D6-100	GP1K-100	UC-541			
C12	10			TCN-10	N750K-100	NT-541			Note 5
C13	1000			DD-102	801-001	DC-521			
C14	1000			D6-102	GP2L-102	UC-521			
C15	10000			DD-103	811-01	DC-511			
C16	1000			DD-102	801-001	DC-521			
C17	10000			DD-103	811-01	DC-511			
C18	47			D6-470	831-470	UC-5447			
C19	.05	400		DF-503		PT415	IMP4-S5	330415	
C20	10000			DD-103	811-01	DC-511			
C21	47			D6-470	GP1K-470	UC-5447			
C22	10000			DD-103	811-01	DC-511			
C23	10000			DD-103	811-01	DC-511			
C24	47			D6-470	GP1K-47	UC-5447			
C25	47			D6-470	GP1K-47	UC-5447			
C26	10000			DD-103	811-01	DC-511			
C27	47			D6-470	831-470	UC-5447			
C28	10000			DD-103	811-01	DC-511			
C29	10000			DD-103	811-01	DC-511			Note 2
C30	47			D6-470	831-470	UC-5447			
C31	10000			DD-103	811-01	DC-511	IMP6-S1	330611	Note 4
C32	.25	200				PT4025	IMP2-P25	3302025	Note 3
C33	10000			DD-103	811-01	DC-511			Note 2
C34	10000			DD-103	811-01	DC-511			Note 2
C35	.05	600		DF-503		PT615	IMP6-S5	330615	

Note 1. Some versions use 2.2MMF in this application.
Note 2. Not used in some versions.
Note 3. Some versions use .1MFD in this application.
Note 4. Some versions use .05MFD in this application.
Note 5. Some versions use 22MMF in this application.

CHASSIS—TOP VIEW



PROPERTY OF
L. E. ELLINGHAM
1024 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Bell Sound PART No.	IRC PART No.	
R1	68Ω	½		BTS-68	
R2	3.3Meg	½		BTS-3.3Meg	
R3	1000Ω	½		BTS-1000	
R4	10KΩ	½		BTS-10K	
R5	1000Ω	½		BTS-1000	
R6	470KΩ	½		BTS-470K	
R7	100Ω	½		BTS-100	
R8	560Ω	½		BTS-560	
R9	1Meg	½		BTS-1Meg	
R10	22KΩ	½		BTS-22K	
R11	1Meg	½		BTS-1Meg	
R12	1Meg	½		BTS-1Meg	
R13	100KΩ	½		BTS-100K	Note 1
R14	1000Ω	½		BTS-1000	
R15	47KΩ	1		BTA-47K	
R16	470KΩ	½		BTS-470K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Bell Sound PART No.	IRC PART No.	
R17	1000Ω	½		BTS-1000	
R18	100KΩ	½		BTS-100K	
R19	15KΩ	½		BTS-15K	
R20	15KΩ	½		BTS-15K	
R21	100KΩ	½		BTS-100K	
R22	100KΩ	½		BTS-100K	
R23	68KΩ	½		BTS-68K	
R24	470KΩ	½		BTS-470K	
R25	2200Ω	½		BTS-2200	
R26	10KΩ	½		BTS-10K	
R27	100KΩ	½		BTS-100K	
R28	100KΩ	½		BTS-100K	
R29	33Ω	½		BTS-33	Note 1
R30	220Ω	½		BTS-220	
R31	220Ω	½		BTS-220	
R32	220Ω	½		BTS-220	

Note 1. Not used in some versions.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	Bell Sound PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @.26A	130VAC @.031A	6.3VAC @2.48A		FT-31850					

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	Bell Sound PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	FM Ant. Coil	.8Ω			19-1000		4602	1 Microhenry, IRC part #CLA
L2	RF Choke	3Ω			19-1003		4608	3.3 Microhenries, IRC part #CLA
L3	FM RF Coil	0Ω						
L4	FM Osc. Coil	0Ω						
L5	Cathode Choke	.8Ω			19-1000		4602	1 Microhenry, IRC part #CLA
L6	RF Choke	.8Ω			19-1000		4602	1 Microhenry IRC part #CLA
L7	AM Ant. Coil	.2Ω	1.5Ω	GL-31866				
L8	AM Osc. Coil	4.2Ω			14-1060 *	BC-387 *	71-OSC ■	Tapped @ .4Ω
L9	1st. FM IF	.6Ω	.6Ω	GT-24605	16-3487	FM-254	1463	
L10	1st. AM IF	15Ω	15Ω	GT-34609	16-6758	BC-352	12-C1	
L11	2nd. FM IF	.7Ω	.7Ω	GT-24606	16-3487	FM-254	1463	
L12	2nd. AM IF	15Ω	15Ω	GT-34610	16-6758	BC-353	12-C2	
L13	3rd. FM IF	.6Ω	.6Ω	GT-24605	16-3487	FM-254	1463	
L14	Discriminator	.7Ω	.9ΩCT	GT-24608	17-3484 ▲	FM-253	1464	

* Use secondary winding and drill mounting hole.
■ Use primary winding only.
▲ Drill mounting holes.

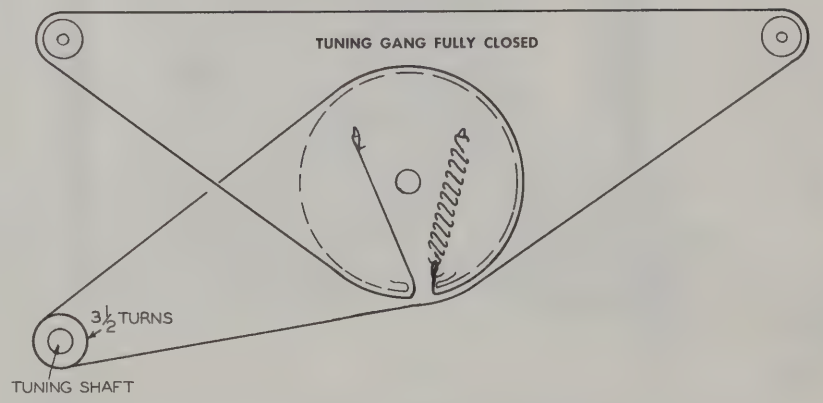
PARTS LIST AND DESCRIPTIONS (Continued)

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	Bell Sound PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.031A	Z20690	1263A	RS-050		8J1	50	

MISCELLANEOUS

ITEM No.	PART NAME	Bell Sound PART No.	NOTES
M2	Dial Light	HK-JV31865	#47, Bayonet
M3	Tuning Cap.		4 Gang - AM Sections (20-535MMF, 25-205MMF)
M4	Switch		On-off- & Selector



DIAL CORD STRINGING

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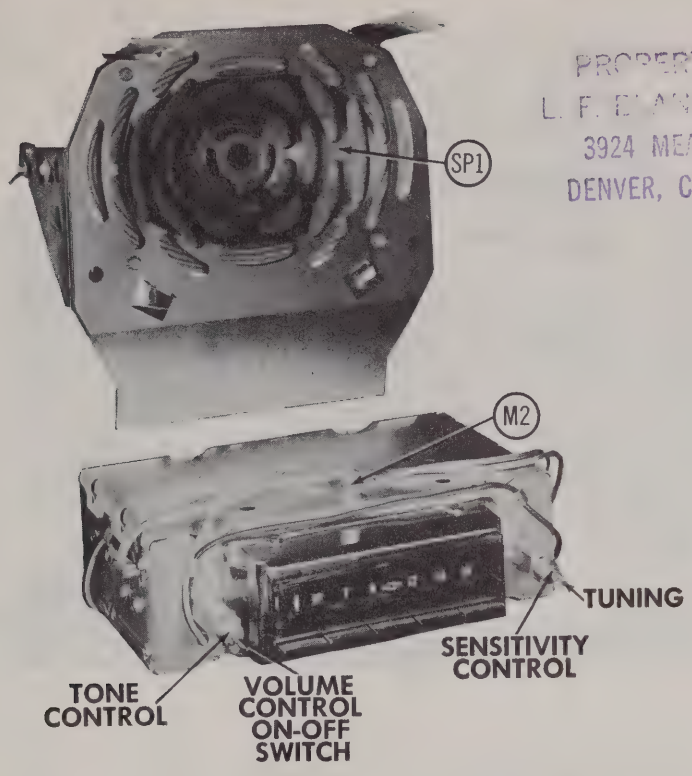

TRADE NAME	Chevrolet Model 987086 (For 1955 Chevrolet Automobiles)
SUPPLIER	Chevrolet Motor Div., General Motors Corp., Detroit, Mich.
TYPE SET	Battery Operated Custom Built AM Automobile Superheterodyne Receiver
TUBES (Eight)	Types 12BA6 RF Amp., 12BE6 Conv., 12BA6 IF Amp., 12BF6 Det-AVC-AF Amp., (2) 12V6GT Output, 12AU7 Trigger Amp., 0Z4 Rectifier
POWER SUPPLY	12 Volt Storage Battery — RATING 3.1 Amp. @ 12.6 Volts DC
TUNING RANGE—BROADCAST	540KC - 1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Sensitivity control at position 2.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V2). Low side to chassis.	262KC (400∿ Mod)	High frequency end of dial.*	Across C5	A1, A2, A3	Adjust for maximum deflection.
2.	"	"	"	"	"	A4	Adjust for MINIMUM deflection.
3.	68MMFD	Thru dummy to antenna receptacle. Low side to chassis.	1615KC	"	"	A5, A6, A7	Preset A8 (Osc. core) so that rear of core is 1 25/32" from mounting end of coil form. Adjust A5, A6 and A7 in order given for maximum deflection.
4.	"	"	600KC	Tune to 600KC signal.	"	A9, A10	Adjust for maximum deflection.
5.	"	"	1615KC	Tune to 1615KC signal.	"	A6, A7	"
6.	"	"	1000KC	Tune to 1000KC signal.	"		If necessary, adjust dial pointer so that pointer reads 1000KC. With receiver installed in car and antenna fully extended, tune to weak signal between 600KC and 1000KC. Adjust A7 for maximum volume.

* Tune to high freq., put 0.070 feeler gauge in slot against high freq. stop. Turn manual control till planetary arm is against feeler gauge. See Tuner picture.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		CHEVROLET PART No.	STANDARD REPLACEMENT		
V1	RF Amp.	12BA6	12BA6	7BK	
V2	Converter	12BE6	12BE6	7CH	
V3	IF Amp.	12BA6	12BA6	7BK	
V4	Det-AVC-AF Amp.	12BF6	12BF6	7BT	
V5	Audio Output	12V6GT	12V6GT	7S	
V6	Audio Output	12V6GT	12V6GT	7S	
V7	Trigger	12AU7	12AU7	9A	
V8	Rectifier	0Z4	0Z4	4R	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	CHEVROLET PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	■20	400	M-908			FP345.8	TM-3036	T-665	
B	▲20	400							
C	20	25							
C2	.05	200	6512	DF-503		PT415	IMP2-S5	330215	
C3	.05	200	6512	DF-503		PT415	IMP2-S5	330215	
C4	.1	400	6513	DF-104		PT401	IMP4-P1	330401	
C5	68	500	G-680	D6-680	GP1K-680	UC-5468		K-1468	
C6	39		G-390	D6-390	GP1K-390	UC-5439		K-1439	
C7	260		7257567						
C8	.05	200		DF-503		PT415	IMP2-S5	330215	
C9	100	500	1219498	TCZ-100	NP0-333-101	ZT-531		KR-1310	
C10	100	500	1219498	TCZ-100	NP0-333-101	ZT-531		KR-1310	
C11	68	500	G-680	D6-680	GP1K-680	UC-5468		K-1468	
C12	.002	600	6528	D6-202	GP2-333-202	PT622	IMP6-D2	330622	
C13	.003	600	6529	D6-302	GP2-333-302	PT623	IMP6-D3	330623	
C14	.1	400	6513	DF-104		PT401	IMP4-P1	330401	
C15	.015	600	7237719			PT6115	IMP6-S15	3306115	
C16	100	500	G-101	D6-101	GP1K-101	MC235		K-1310	
C17	.003	1000	H-302	DD16-302	1R5KV-302	PT1623	CT10-D3		
C18	2000		7265426	DD-202	801-002	DC-522		C-1220	
C19	.5	200	6592				85LPT2-P2	330205	
C20	.007	1600	H-702			PT1627	CT16-D7		
C21	.47	100	6592				85LPT2-P5		
C22	.47	100	6592				85LPT2-P5		

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	CHEVROLET PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	7265302			F1-41	UF55A *	Tone - Panel
B	750KΩ	½				R2-59	UR16T25	Volume tap at 200KΩ - Rear
C	Bushing					AK-27	EB-214	Attach to R1A
D	Switch					KB-7	US-27	Attach to R1B

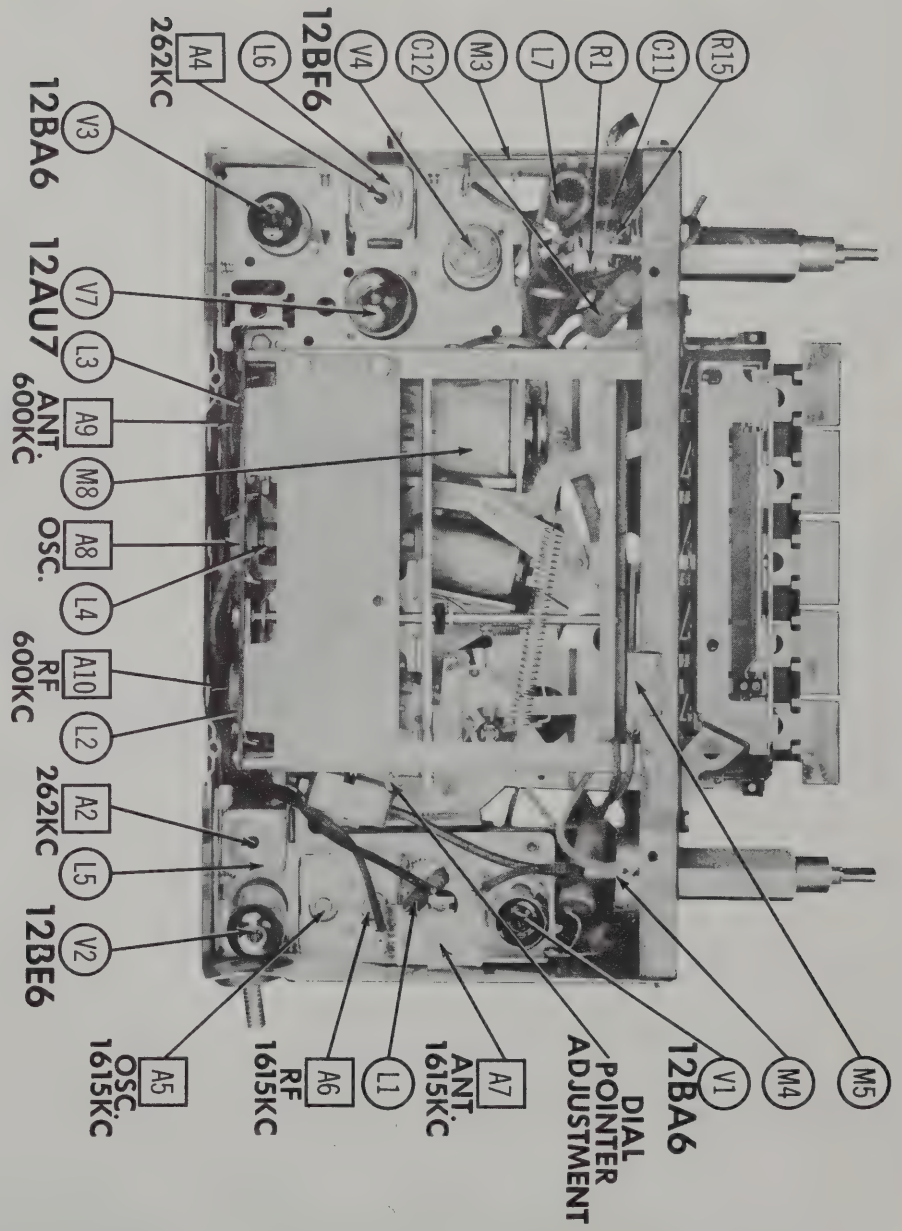
* Mallory Exact Duplicate Part No. UE1477S

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CHEVROLET PART No.	IRC PART No.	
R2	2.2Meg	½	1239	BTS-2.2Meg	
R3	100Ω	½	1113	BTS-100	
R4	1Meg	½	1235	BTS-1Meg	
R5	10KΩ	1	1174	BTA-10K	
R6	22KΩ	½	1215	BTS-22K	
R7	330KΩ	½	1229	BTS-330K	
R8	12KΩ	2	1276	BTB-12K	
R9	10Ω	½	1101	BTS-10	
R10	150Ω	½	1115	BTS-150	
R11	1.5Meg	½	1219492	BTS-1.5Meg	
R12	1Meg 5%	½	1220169	BTS-1Meg 5%	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CHEVROLET PART No.	IRC PART No.	
R13	1.5Meg 5%	½	1219492	BTS-1.5Meg 5%	
R14	47KΩ	½	1219	BTS-47K	
R15	100KΩ	½	1223	BTS-100K	
R16	1Meg	½	1235	BTS-1Meg	
R17	1000Ω	½	1125	BTS-1000	
R18	3300Ω	½	1131	BTS-3300	
R19	2.2Meg	½	1239	BTS-2.2Meg	
R20	47KΩ	1	1259	BTA-47K	
R21	360Ω 5%	2	7234563	BTB-360 5%	
R22	15KΩ	1	1253	BTA-15K	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CHEVROLET PART No.	IRC PART No.	
R23	1800Ω	2	1171	BTB-1800	
R24	120KΩ	1/2	1224	BTS-120K	
R25	47KΩ	1	1220188	BTA-47K	
R26	100KΩ	1/2	1223	BTS-100K	Note 1
R27	47KΩ 5%	1	1220188	BTA-47K 5%	Note 2
R28	10KΩ	1	1174	BTA-10K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CHEVROLET PART No.	IRC PART No.	
R29	910Ω 5%	1/2	7266033	BTS-910 5%	
R30	10KΩ	1	1137	BTA-10K	
R31	3900Ω	1	1169	BTA-3900	
R32	5.6Meg	1/2	1244	BTS-5.6Meg	
R33	1000Ω	1/2	1125	BTS-1000	
R34	22KΩ	1/2	1215	BTS-22K	

Note 1: Some versions may use a 33KΩ resistor in this application.
Note 2: Not used in some versions.

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	CHEVROLET PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	12VCT @ 1.8A	384VCT .062ADC			6067	P-6489			V3902	

TRANSFORMER (DRIVER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	CHEVROLET PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T2	1.8KΩ Res.				6061					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	CHEVROLET PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T3	7.9KΩ CT	3.3Ω	6063	A-3852 ①	A-2936 ①	S-15X ①	Z1007 ①	22S56 ①	① Fabricate mounting.

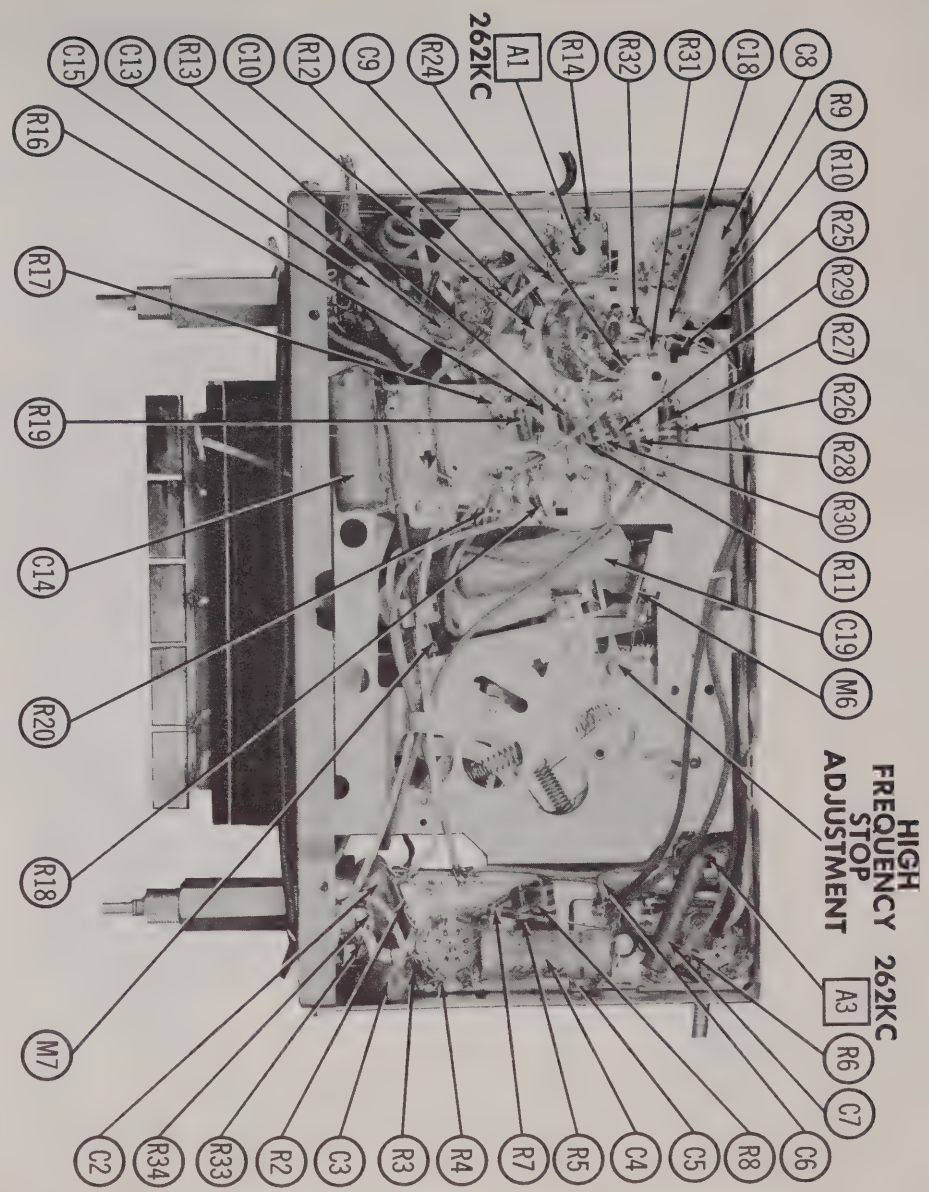
SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	CHEVROLET PART No.	JENSEN PART No.	QUAM PART No.	
SP1	6" X 9"	PM	3.3Ω	6112	ST-810 Mod. P69-V	69A3	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	CHEVROLET PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Loading Coil	.6Ω		7255738	19-1004		4610	7 Microhenries
L2	Ant. Coil	10Ω		7257979				
L3	RF Coil	9.5Ω		7257979				
L4	Osc. Coil	.9Ω	3.8Ω	7263287				
L5	Input IF	40Ω	38Ω	1219508	16-6752	BC-350	12-H1	
L6	Output IF	32Ω	32Ω	1220204	16-6754	BC-354	12-H6	
L7	Fil. Choke	0Ω		1217846	19-1001		4604	1.4 Microhenries
L8	Vib. Hash Choke	.1Ω		7265389				42 Microhenries

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				CHEVROLET PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	12V	115∿	8550	6330	G874/G883	6330	

MISCELLANEOUS

ITEM No.	PART NAME	CHEVROLET PART No.	NOTES
M2	Dial Light		#57, Bayonet
M3	Spark Plate	1220682	
M4	Switch	7265298	Sensitivity
M5	Switch	7265300	Station Selector
M6	Switch	7263340	Tuner Return
M7	Relay	1220326	
M8	Solenoid & Plunger Ass'y.	1220685	
	Trimmer Cap.	7242454	Dual Trimmer (4 sections) Osc. & RF Trimmers
	Trimmer Cap.	7265255	Ant. Trimmer
	Pushbutton	1220193	Slide Contact & Insulator (Set of 5)
	Tab Rail Board	7263916	
	Contact	1220191	Selector Tab (Set of 5)
	Indicator	1220192	Selector Tab (Set of 5)
	Pointer Back Plate	7264086	
	Pushbutton & Slide Assembly	1220281	
	Pointer Arm Ass'y	7265297	
	Dial	7265308	Calibrated
	Dial Back Plate	7265684	
	Knob	7265132	Sensitivity & Tone
	Knob	1990777	Tuning & On-Off-Volume

PUSHBUTTON ADJUSTMENTS

1. Open the hinged door below the dial exposing the selector tabs.
2. Tune in the desired signal nearest the left end of the dial.
3. Move the first selector tab (one farthest left) until it lines up with the pointer tip.
4. Repeat set-up steps 2 and 3 for the remaining selector tabs, choosing stations from left to right on the dial.
5. Check the settings of each selector tab by depressing the corresponding station selector button. If the correct station is not tuned in readjust the selector tab.

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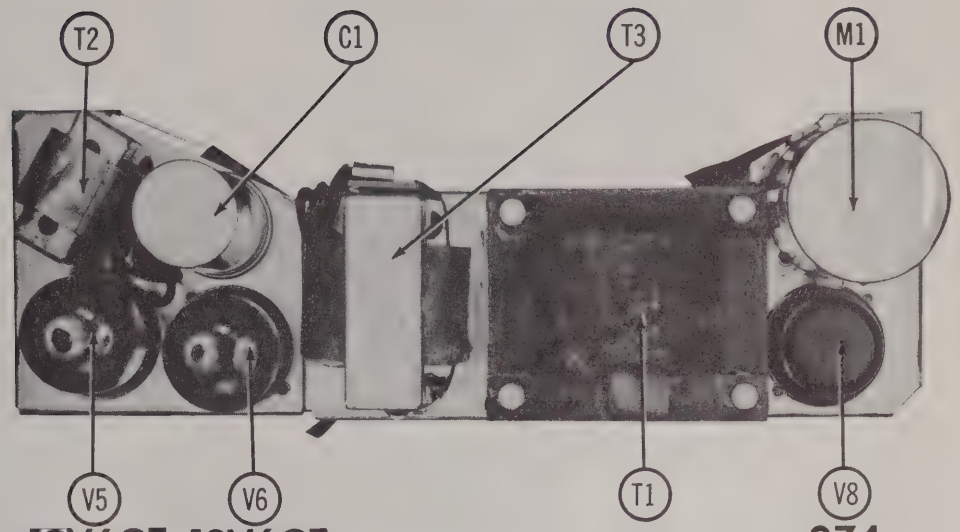

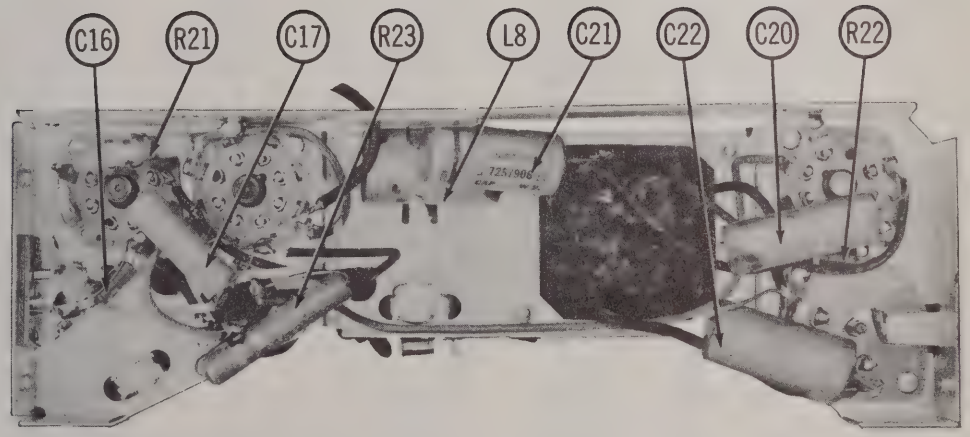

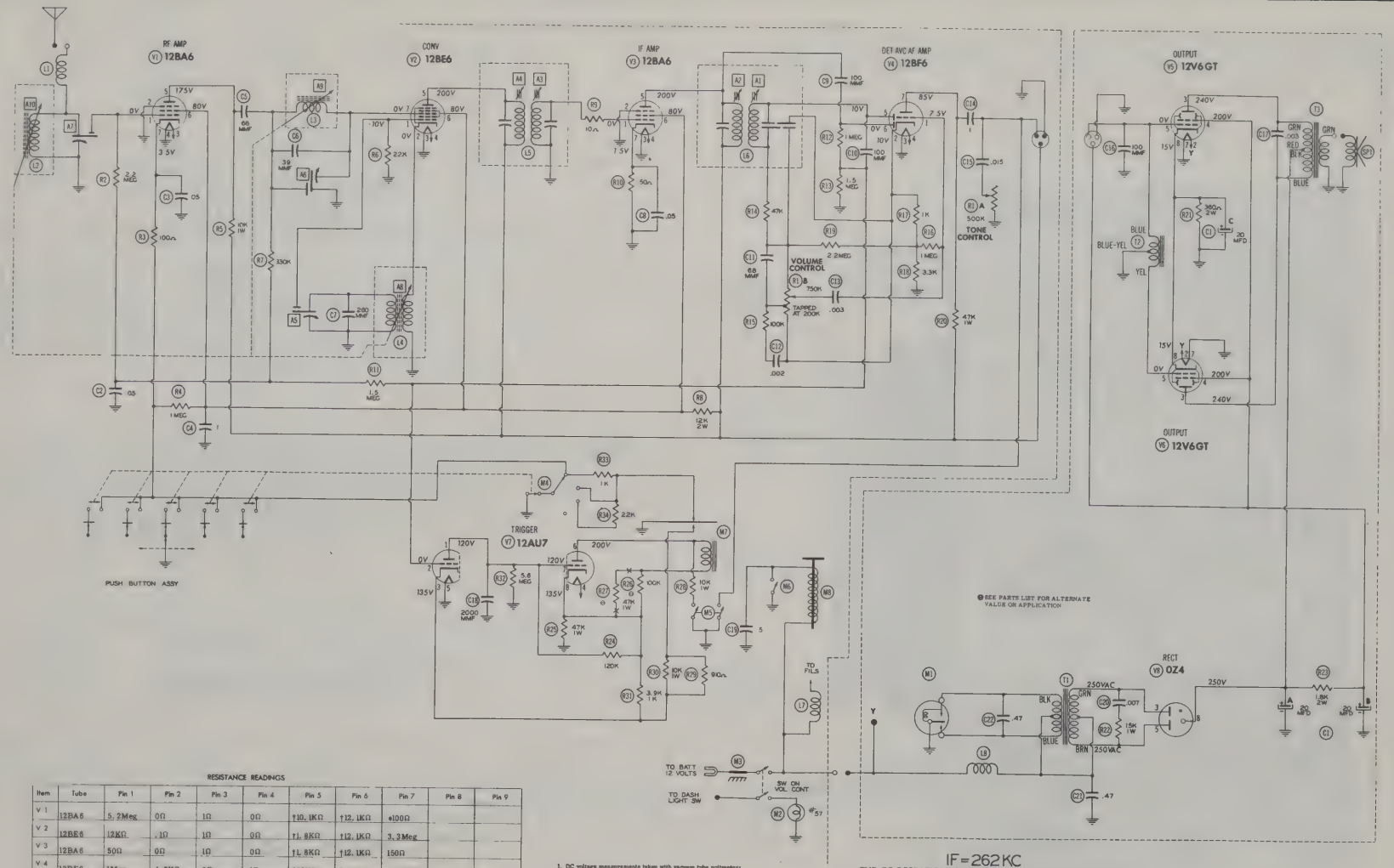

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12BA6	5.2Meg	0Ω	1Ω	0Ω	†10.1KΩ	†12.1KΩ	♦100Ω		
V 2	12BE6	12KΩ	.1Ω	1Ω	0Ω	†1.8KΩ	†12.1KΩ	3.3Meg		
V 3	12BA6	50Ω	0Ω	1Ω	0Ω	†1.8KΩ	†12.1KΩ	150Ω		
V 4	12BF6	1Meg	4.3KΩ	0Ω	1Ω	600KΩ	2.5Meg	†48.8KΩ		
V 5	12V6GT	NC	1Ω	†220Ω	†1.8KΩ	700Ω	NC	0Ω	360Ω	
V 6	12V6GT	NC	1Ω	†220Ω	†1.8KΩ	700Ω	NC	0Ω	360Ω	
V 7	12AU7	†154KΩ	1.5Meg	†38KΩ	1Ω	0Ω	†3.4KΩ	†154KΩ	†34.8KΩ	NC
V 8	0Z4	TP	NC	225Ω	NC	225Ω	NC	NC	80KΩ	

† MEASURED FROM PIN 8 OF V8.
♦ MEASURED WITH SENSITIVITY SWITCH IN MAXIMUM SENSITIVITY POSITION.
NC - NO CONNECTION TP - TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on components - 10% unless otherwise specified.
6. Volume control at maximum, no signal applied for voltage measurements.

IF = 262 KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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DENVER, COLORADO

COLUMBIA RECORDS
950-274

COLUMBIA RECORDS
950-274

Figure 1

GENERAL INFORMATION

The Columbia 950-274 High Fidelity Record Changer is a three speed changer designed to play, in automatic sequence, a stack of either 7", 10" or 12" records, or 10" and 12" intermixed, and shut off automatically after playing the last record.

As many as ten 12"; twelve 10", or any assortment of 10" and 12" records of the same type (33 1/3 or 78 R. P. M.) may be stacked on the spindle.

A full stack of twelve 7", 33 1/3 R. P. M. records or a full stack of twelve 7", 45 R. P. M. records (with the use of an adaptor) will also play and be automatically changed on this changer.

Connect this changer only to an outlet supplying 117 volts, 60 cycle AC unless otherwise specified.

COLUMBIA RECORDS

A Division of Columbia Broadcasting System, Inc.

799 Seventh Avenue, New York 19, New York

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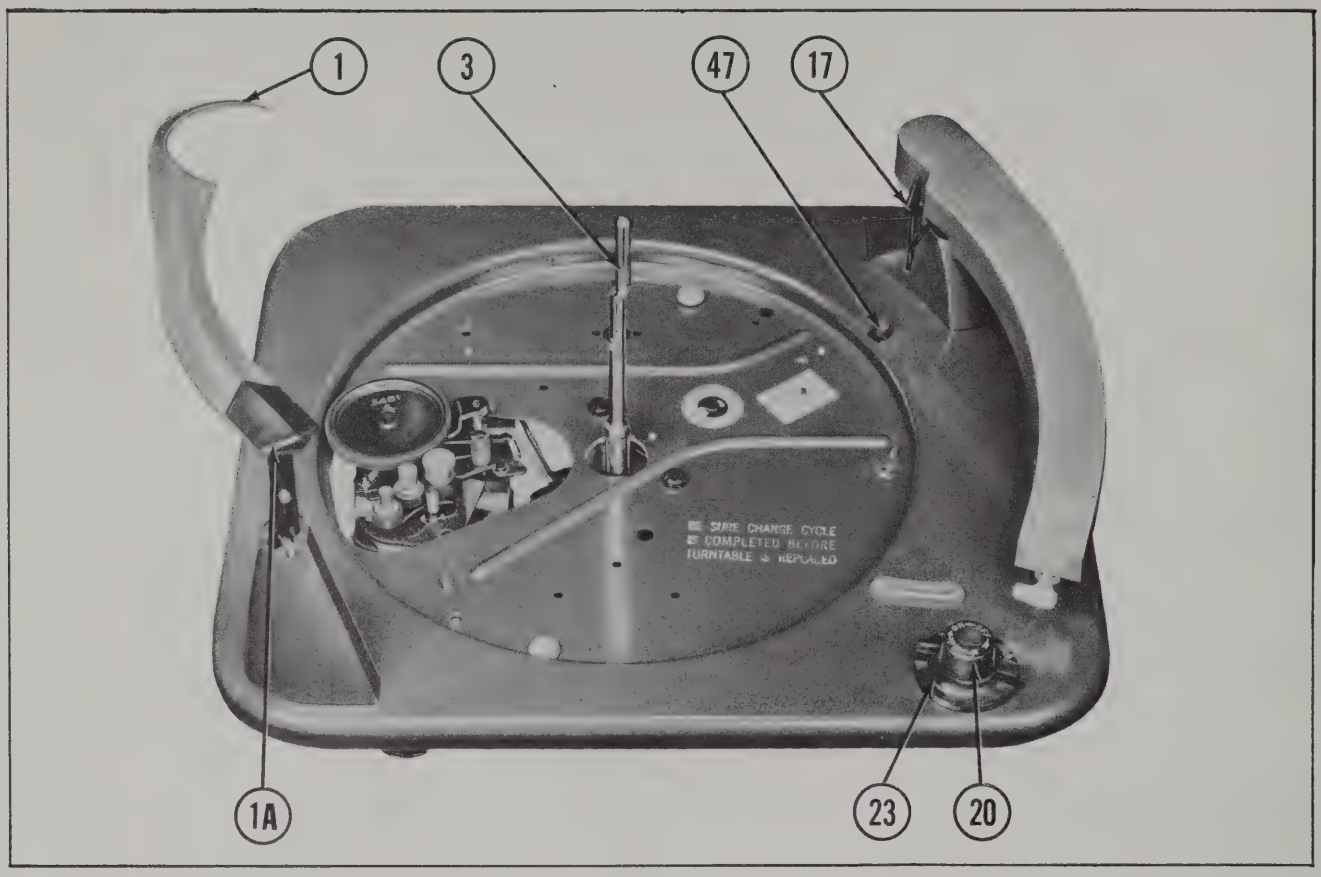

Figure 2

PREPARING FOR OPERATION

Shipping Bolts -

Before placing in operation, the machine must be floated freely on the mounting springs. During shipment, the mechanism is secured by means of two shipping bolts. To float the changer, remove the turntable by lifting it straight up the spindle. Turn the two shipping bolts in a clockwise direction as far as they will go and replace the turntable. Before the turntable can be fully seated, the idler wheel must be gently pushed back out of the way to prevent damage to the motor.

CONTROLS

This record changer is provided with a dual control located in the right hand corner of the motorboard.

The outer portion of the dual control designated as "Rej. -On-Off" provides a means of controlling the operation of the mechanism while the inner control having the markings "78-45-33" governs the turntable speed.

By turning the outer control to the "On" position the turntable starts rotating. Turning the control one step further in a clockwise direction to the "Rej." position and permitting the knob to return to the "On" position starts the complete automatic operation of the mechanism.

The inner or motor speed control makes possible the selection of one of three speeds, 33 1/3, 45, or 78 R. P. M., by rotating the knob to the proper position.

OPERATION

Loading -

1. Pull straight up on record support knob until record support clears spindle. Swing record support to the left until pin in shaft drops into locating groove.

2. The changer will automatically play ten 12" either standard or long-play records, twelve 10" either standard or long-play records, any assortment of ten 12" and 10" records intermixed, or twelve 7" long-play or fine-groove records.

NOTE: Standard, fine-groove, and long-play records cannot be intermixed. Motor speed control knob must be reset for each type of recording.

3. Place records on spindle and lower to offset shelf. Hold records level and replace record support over spindle.

To Play Standard Recordings -

1. Motor speed control knob must be in the "78" position.

2. To start, turn changer control knob to "Rej." and release. Changer will operate automatically until the last record has been played. Pickup arm returns to rest and the changer control knob to the "Off" position. Changer automatically stops.

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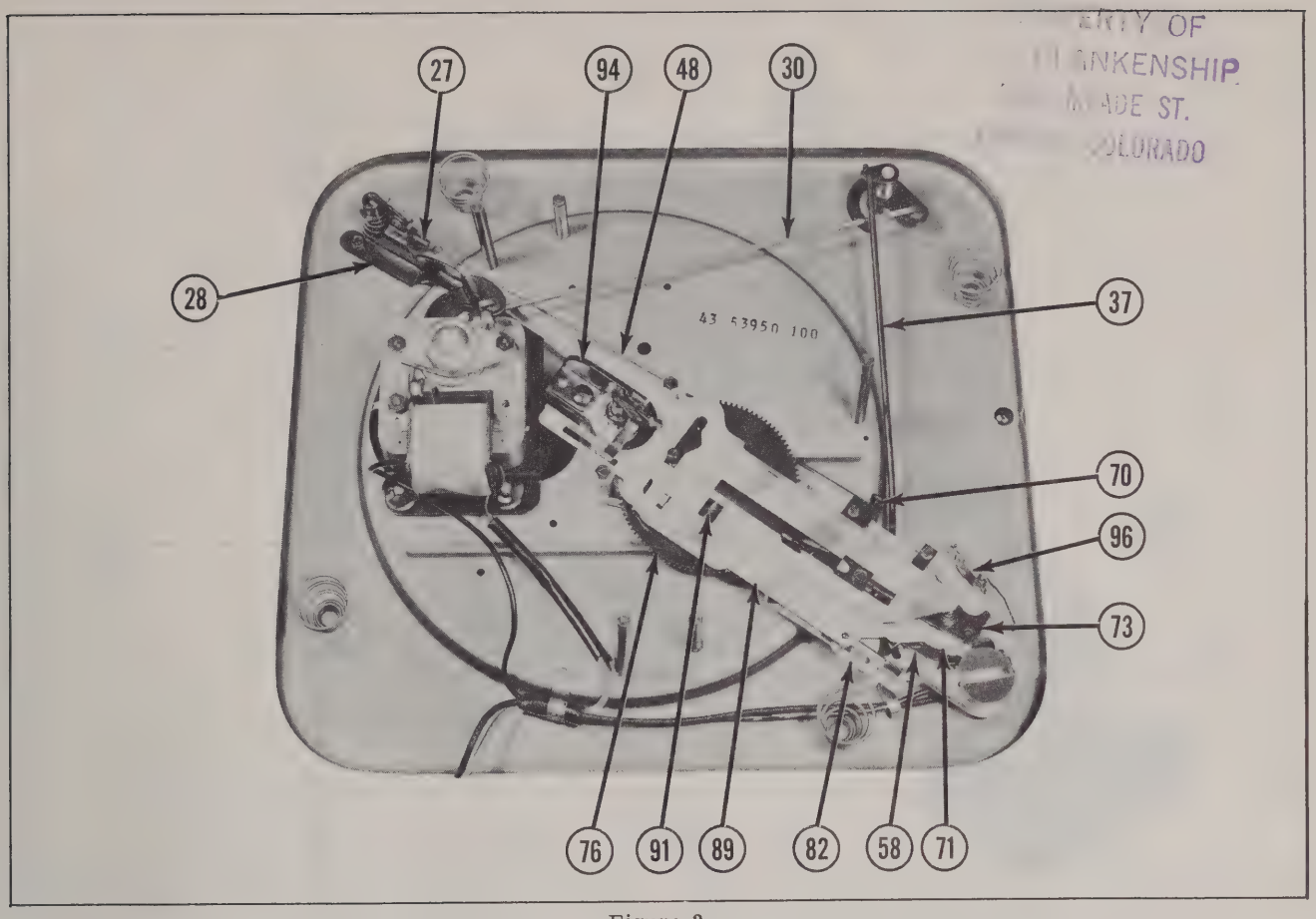


Figure 3

Leveling Record Changer-

It is essential to have the record changer absolutely level. Use a torpedo or similar type level on the record changer baseplate. Use adequate shims to level the record changer pan or radio combination cabinet to achieve perfect level.

To Play Long-Play (33 1/3 RPM) Records-

1. Motor speed control knob must be in the "33" position.

To Play Fine-Groove (45 RPM) Records-

1. Motor speed control knob must be in the "45" position.

2. Most of these records are manufactured with a 1 1/2" spindle hole. It is essential that a record adaptor be used with all large hole records.

Rejecting-

To reject a record at any time while changer is operating, turn changer control knob to "Rej.", hold momentarily, and release.

Stopping-

To turn off changer before automatic shut-off, turn changer control knob to "Off". Lift pickup arm and place on rest.

Unloading-

Lift the record support and swing to the left until pin in shaft drops into locating groove. Lift stack of records straight up and off spindle.

Manual Operation-

To play single records or home recordings, allow the changer to go through its complete shut-off cycle. Lift the record support arm and move it to the left until clear of the turntable. Place record on spindle and lower to spindle shelf. Tilt record down toward the rear of pickup arm and lower record to turntable. Turn changer control knob to "On" position only. Raise pickup arm and gently place needle in lead-in groove of record.

Repeating Of 7", 10", Or 12" Records-

To repeat records, swing record support clear of turntable, place record on the turntable, and start changer. Record repeats until control is turned "Off". If a 12" record is repeated, wait for the changer to finish cycling and reposition the pickup arm manually to the 12" position.

Suggestions-

When loading and unloading the changer, use care to prevent bending the spindle. Records should not be left on spindle except during operation of changer. Records will warp. When machine is not in use, it is suggested that the speed control knob be left in "N" position. This position is identified by the letter "N"

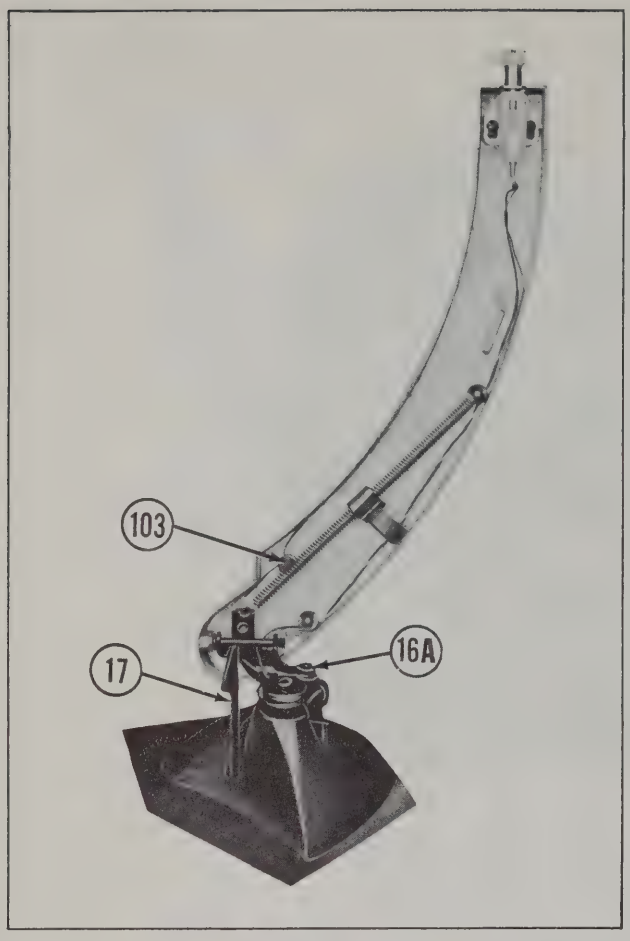


Figure 4

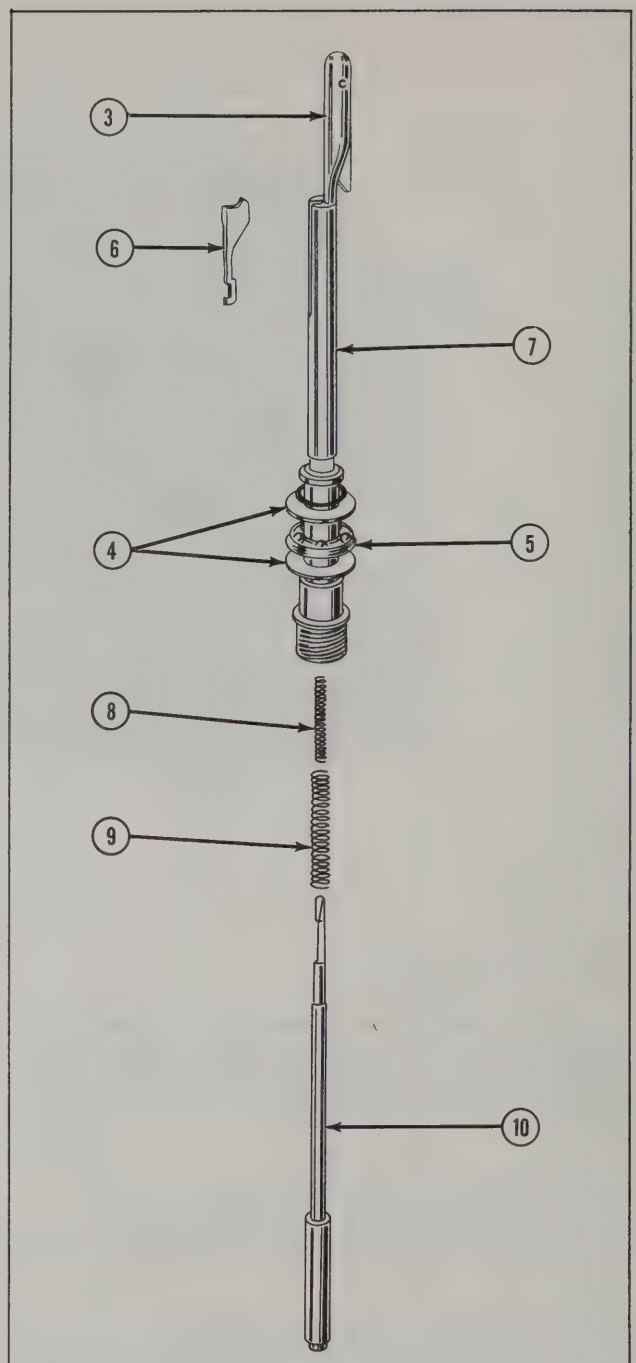
engraved on the speed control knob. For best reproduction, keep needle and records clean. Store records flat, in folders or in albums. Do not lay record on record.

CHANGE CYCLE

It is recommended that the change cycle operation, be observed by rotating the turntable by hand. The action described below can then be readily followed and the function of each part more easily understood.

This changer is provided with what is known as a velocity trip mechanism. The change cycle is started by the faster inward motion of the pickup arm when the needle enters the trip grooves at the end of the record. Only records having fast finishing grooves before the eccentric cycling groove will operate this velocity trip.

The pickup arm and hinge assembly and trip finger cam and shaft assembly (73) are secured at opposite ends so that they move in unison. As the pickup arm nears the end of a record, the trip finger cam (73) pushes the trip link (82), which, in turn, engages the trip lever (81) rotating the pawl lever (79) to move the trip pawl toward the hub on the turntable. While a record is playing, the small motions of the trip pawl are not sufficient to cycle the mechanism because on each revolution of turntable the wiping contact by the hub projection moves the trip pawl back to clear the projection.



A PHOTOFACT "EXPLODED" VIEW
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Figure 5

In the first revolution of the turntable during which the pickup arm advances rapidly, the trip pawl is moved far enough to definitely engage the projection on the turntable hub. The gear on the turntable hub will now engage the main gear (76) and start its rotation. This in turn, starts the lateral motion of the slide and cam assembly (89). The slide and cam assembly (89) moves to the rear through the action of an eccentric pin on the main gear (76) moving in the cross slot on the slide and cam assembly (89).

As the slide and cam assembly begins to move, the cam surface at the rear pushes the lift pin (15) up-

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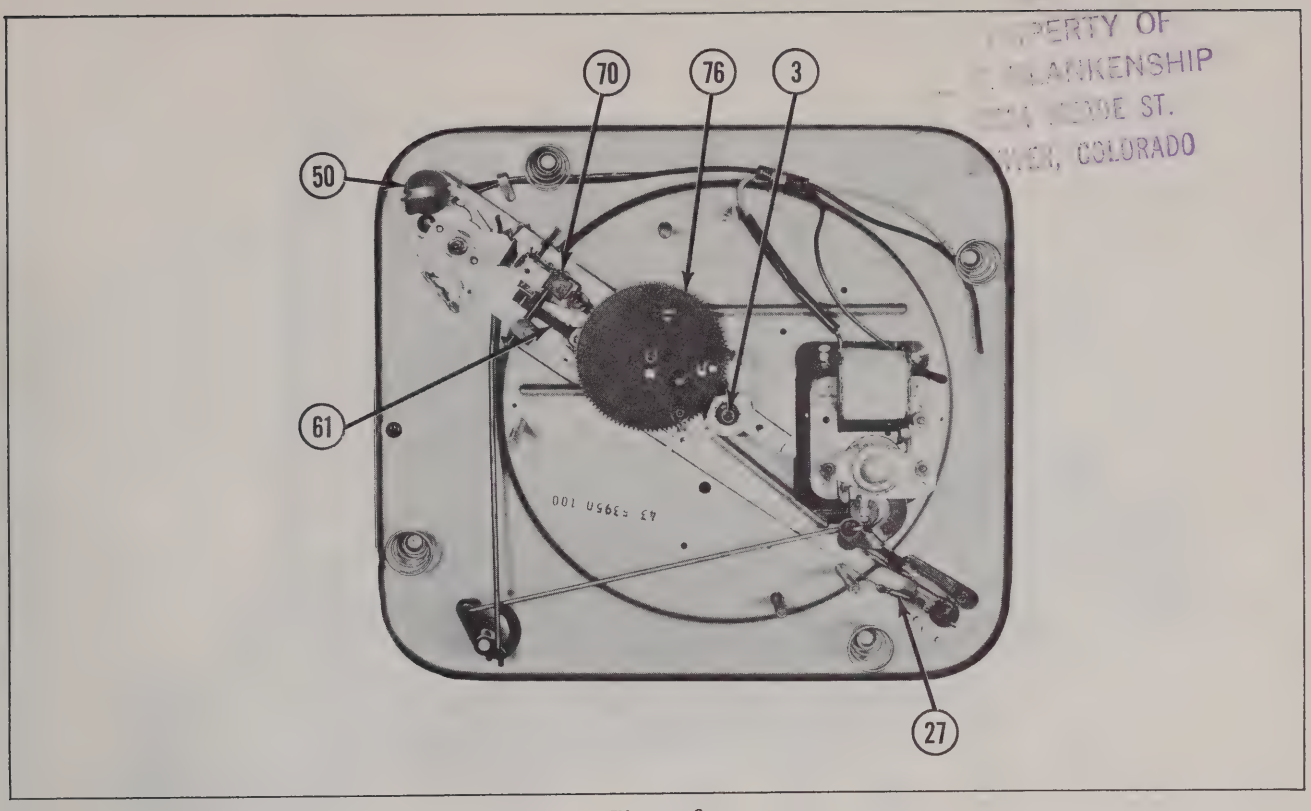

Figure 6

ward, raising the pickup arm clear of the record. At the same time, the tab on the rear of the slide and cam assembly (89) contacts the trip finger cam (73) swinging the pickup arm clear of the turntable.

The front edge of the ejector link slot in the slide and cam assembly (89) then contacts the ejector link on the ejector link assembly (94). The ejector link moves the pusher shaft and housing assembly (10) upward actuating the spindle assembly (3), causing the record pusher (6) to move straight up so as to enter the center hole of the record, and then to be pivoted forward, dropping a record to the turntable. (See Figure 5).

Simultaneously, the tab on the rear of the slide and cam assembly (89) contacts the pickup arm return locator (71), moving it clear of the reset lever (64). The pickup arm return locator (71) is now locked in position with the trip finger cam (73) by means of matching holes in the pickup arm return locator (71) and detents in the trip finger cam (73). This is accomplished by the pressure of the compressed conical lift pin spring (74) overcoming the pressure of the lift pin compression spring washer (72).

At the same time, the cam surface of the bracket on the main gear assembly (76) moves the reset lever (64) to mid-position (10" set-down) where it is held by the 12" record selector (17). The slide and cam assembly (89) continues to the rear and then starts forward. If 7" records are being changed, the rubber bumper (47) of the 7" set-down lever (61) is free to move upward permitting the other end to drop into the hole in the main gear (76) as this gear rotates. This action of the 7" set-down lever (61) raises the reset lever (64) to the upper position (7" set-down).

If 10" records are being changed, the 7" set-down lever (61) will not operate as the rubber bumper (47) will contact the edge of the record and the reset lever (64) will remain in the mid-position (10" set-down) as originally placed by the caming action of the bracket on the main gear (76).

If a 12" record is being changed, the edge of the record strikes the 12" record selector (17) releasing the reset lever (64) which drops to the bottom position (12" set-down).

As the slide and cam assembly (89) continues forward, the tab on the rear of the slide will move clear of the pickup arm return locator (71) and trip finger cam (73), which are still locked together. These rotate under the action of the pickup arm return spring (51) until one of the three set-down steps in the pickup arm return locator (71) strikes the reset lever (64), which has been positioned by the record being changed (see above). This stops the inward movement of the pickup arm return locator (71), trip finger cam (73) and pickup arm. The pickup arm is then lowered to the lead-in grooves of the record at this point as the lift pin (15) rides down the rear cam surface of the slide and cam assembly (89). As the pressure is released from the conical lift pin spring (74), the lift pin compression spring washer (72) separates the pickup arm return locator (71) and trip finger cam (73), permitting the pickup arm to ride freely across the record.

As soon as the last record has been dropped, the record support assembly (1) drops below the shelf on the spindle assembly (3) and the lower end of the record support post contacts the arm of the shut-off lever on the shut-off lever bracket assembly (28). This pulls the control link (48), which in turn, rotates the crank of the lever assembly (70). This forces the lever assembly (70) against the escape lever (90) on the slide and cam assembly (89). At the end of the change cycle, which drops the last record, the end of the lever assembly (70) drops into the main slot on the slide and

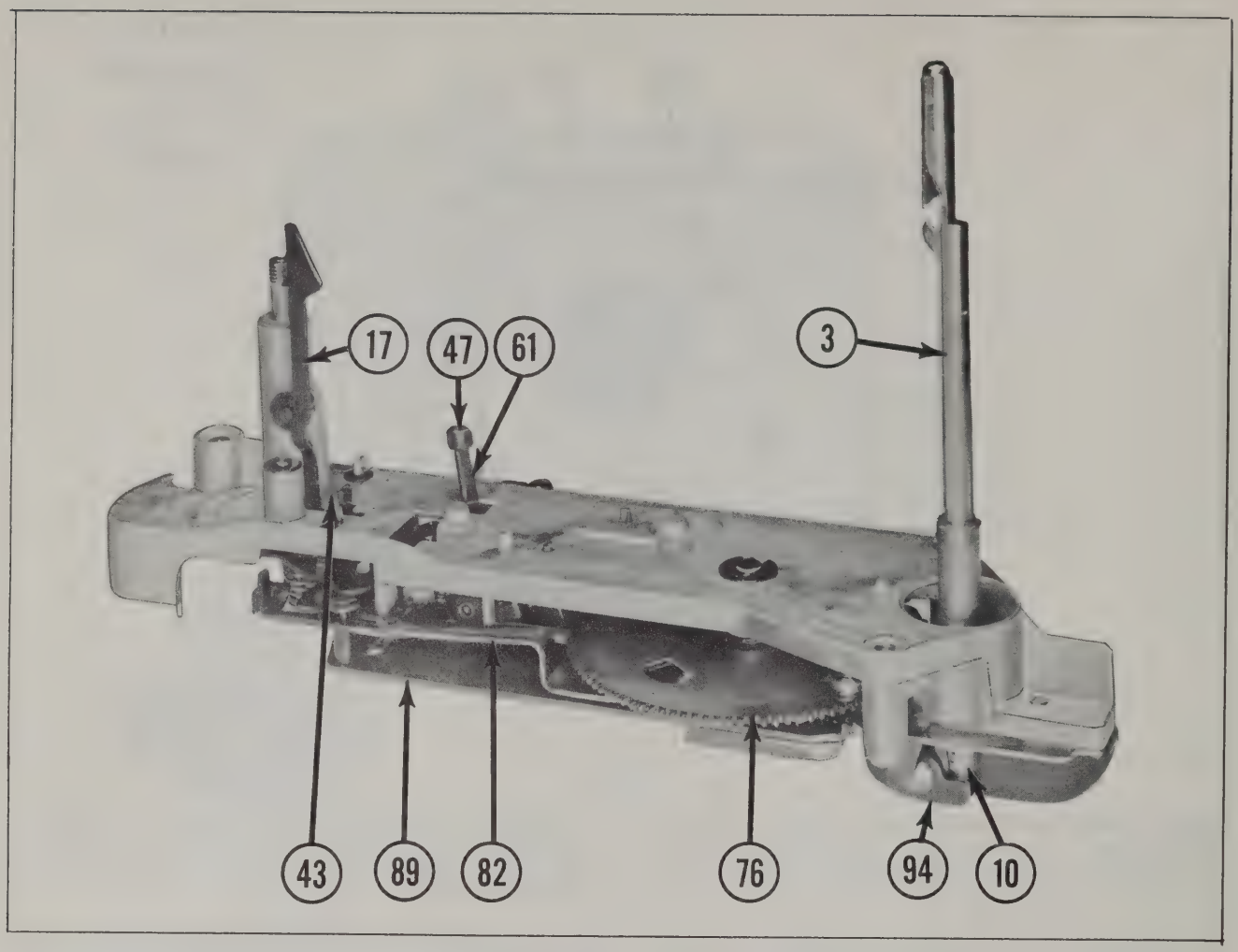

Figure 7

cam assembly (89), and the other end of the lever assembly (70) is pushed against the pickup arm return locator (71).

When the last record has been played, the change cycle starts again; however, this time, as the pickup arm return locator (71) is pivoted clear of the reset lever (64) by the tab on the slide and cam assembly (89), the lever assembly rises to the shut-off position. A tab on the lever assembly (70) raises the trip link (82) to the upper position. As the pickup arm return locator (71) starts to return the pickup arm to the record, it is stopped by the lever assembly (70) with the pickup arm positioned over the pickup arm rest post (22). The main gear continues to rotate pulling the trip link (82) forward to reset it. A tab on the upper surface of the trip link (82) contacts a lever on the control shaft assembly (58) rotating the control shaft assembly to turn off the motor and return the control knob to the "Off" position.

As the slide and cam assembly (89) moves forward, the lift pin (15) rides down the rear cam surface lowering the pickup arm to the pickup arm rest post (22).

TRIPPING & AUTOMATIC SHUT-OFF OPERATION

In the following paragraphs a complete explanation of the mechanical operation pertaining to the "Tripping" and "Automatic Shut Off" operations are given as these phases of the change cycle are likely to be the most difficult to understand.

Tripping-

While a record is playing, the small motions of the trip pawl are not sufficient to cycle the mechanism because on each revolution of the turntable the wiping contact by the hub projection moves the trip pawl back to clear the projection. This slight movement of the pawl continues as long as the pickup moves in at a constant rate of speed. When the needle leaves the recorded section of the record, the rapid acceleration results in rapid movement of the trip pawl. The trip pawl assumes a position in which the projection on the turntable hub makes a positive contact and the main gear (76) is pushed sufficiently for engagement with the teeth on the turntable hub. This starts the change cycle.

Mechanism Stops After Playing Of Last Record-

1. As the last record of the stack drops to the turntable the record support assembly (1) drops and actuates the stop arm on the shut-off bracket assembly (28). This stop arm in turn applies force to shut-off lever assembly (70) through spring (27) and control link (48). At this moment the slide and cam assembly (89) is in the outermost position (away from spindle)

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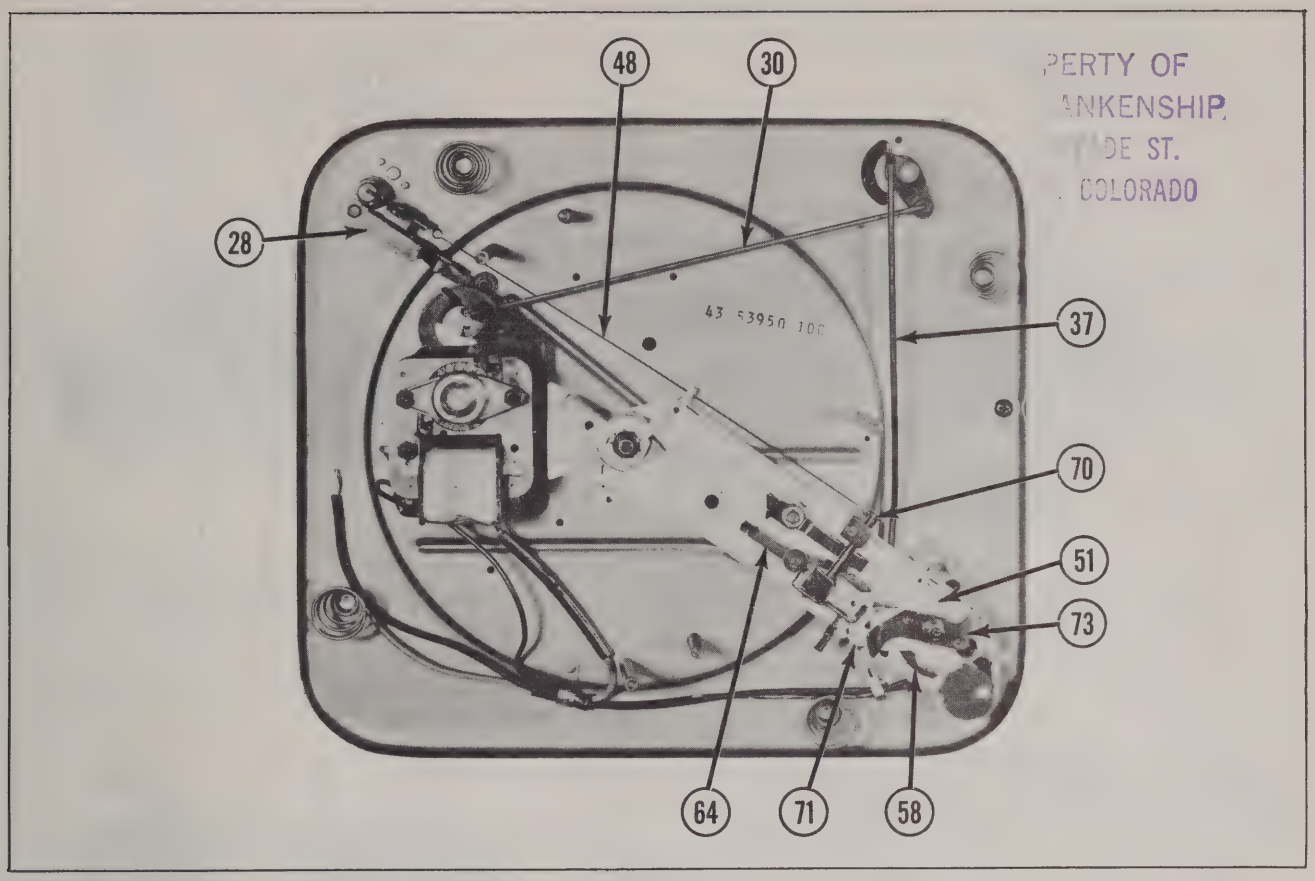


Figure 8

and the end of shut-off lever assembly (70) is forced against escape lever (90) which prevents it from lowering any further.

2. As the slide and cam assembly (89) returns to the out of cycle position the end of shut-off lever assembly (70) slides off the escape lever (90) permitting the end to extend down through the slot in the slide and cam assembly (89). At this time the pickup arm return plate (71) has rotated too far to be blocked by the other end of the shut-off lever (70) and the pickup arm is permitted to land on the record.

3. After the last record has been played the mechanism again goes into change cycle, and the slide and cam assembly (89) moves to its outermost position. At this moment the force which has been applied to the shut-off lever assembly (70) from the record support causes the end to lower, thus extending further through the slide and cam assembly (89). The other end of the shut-off lever (70) raises and blocks the pickup arm return locator (71) which at this moment is held back by the slide and cam assembly (89).

4. As the slide and cam assembly (89) moves back toward the spindle, it carries the raised trip link (82) along until finally the formed end of the trip link pushes control shaft (58) which in turn actuates power switch (50). This removes power from the drive motor and the mechanism stops.

5. The lift pin (15) rides down the incline on the rear of slide assembly (89) and lowers the pickup arm to the arm rest.

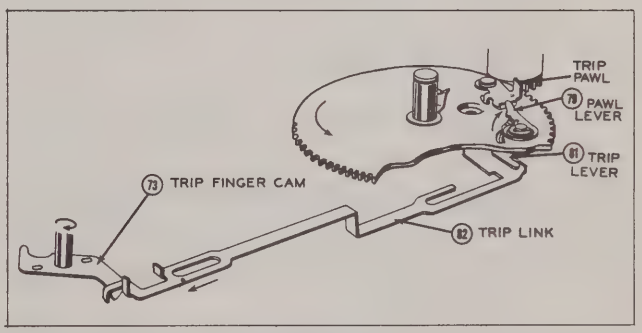


Figure 9

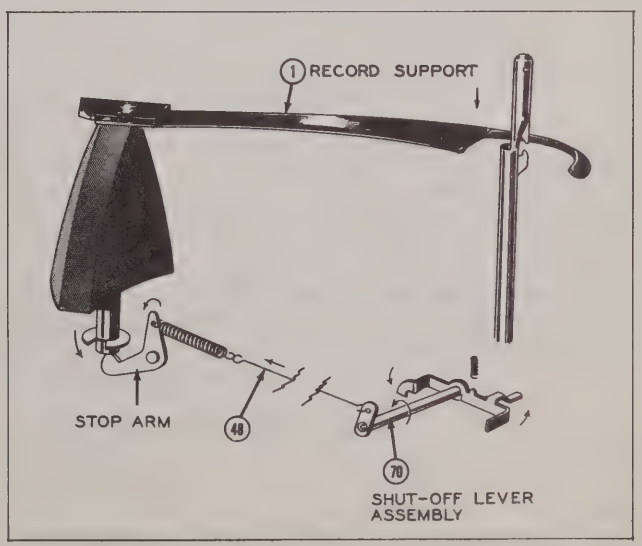
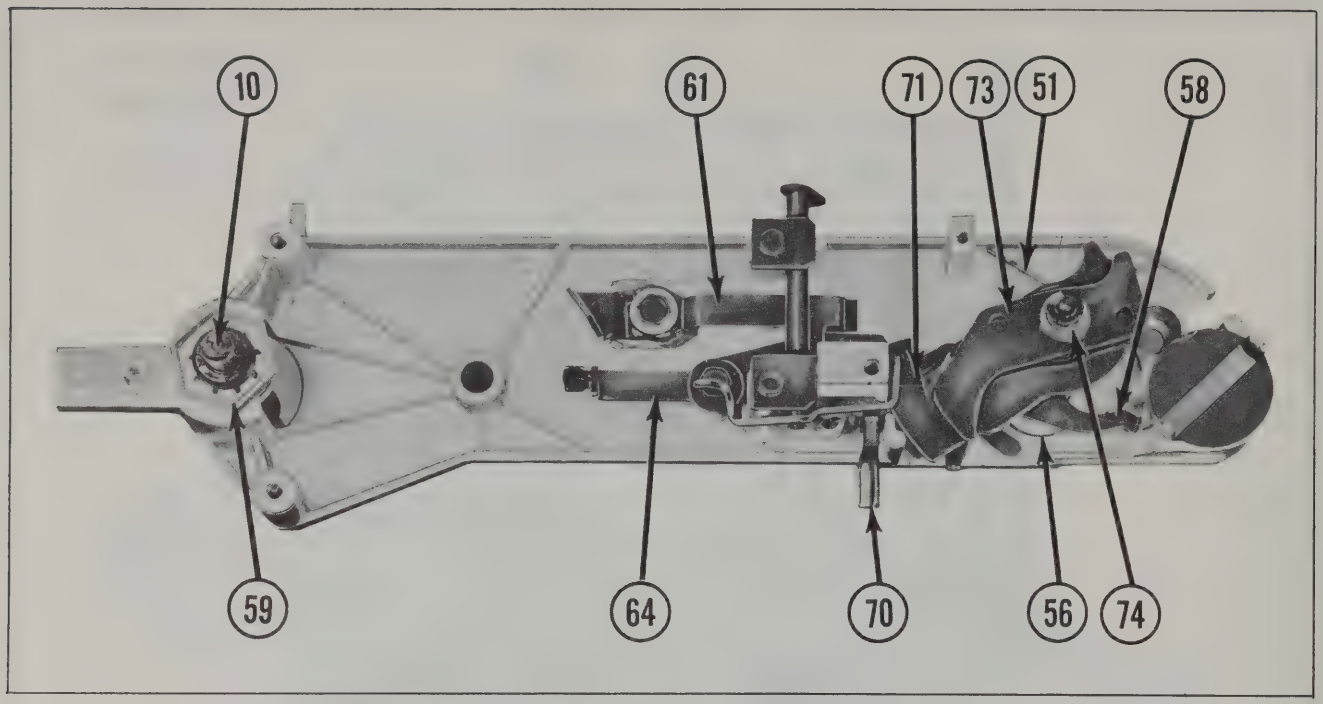


Figure 10



LUBRICATION

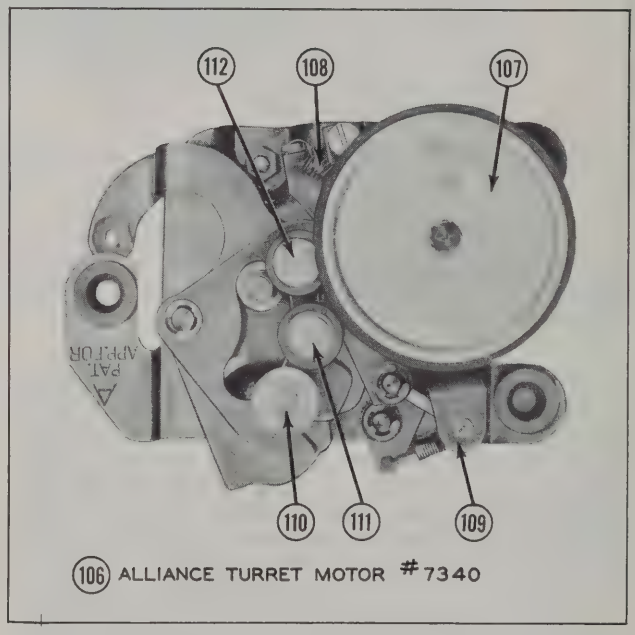
Additional lubrication should not be required for the life of the changer, but in cases of unusual use or high-operating temperature, the changer should be lubricated as follows: (Refer to the exploded view).

Apply Andok "B" or Texaco Sta-Put to:

1. Edges of all slots in slide and cam assembly (89).
2. Outer edges of tines on forked end of slide and cam assembly (89).
3. Lift pin cam surface on slide and cam assembly (89).
4. Lower surface of pickup arm return locator (71).
5. Inner surface of tab on rear of slide and cam assembly (89).

Apply a small quantity of light mineral oil to:

1. Trip finger cam shaft (73).



(106) ALLIANCE TURRET MOTOR #7340

ADJUSTMENTS

Needle Set-Down (Refer to Figure 4) -

The set-down position of the needle is adjusted by means of the set-down adjustment screw (16A) mounted on the hinge arm assembly (16). Turn this screw adjusting pickup arm for correct set-down on a 10" record. When the correct set-down is obtained for the 10" position, the 12" and the 7" needle set-down will also be correct.

Pickup Arm Height (Refer to Figure 4) -

The pickup arm height is adjusted by the lift screw (103) located at the rear of the strengthener. To raise the height of the pickup arm, turn this screw counterclockwise. To lower the pickup arm, turn clockwise. The pickup arm height should be adjusted so that with a 1 1/8" stack of records on the turntable the pickup arm lifts 1/4" straight up as the change cycle starts.

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TROUBLE CHART

SYMPTOM	CAUSE	REMEDY
Turntable does not revolve when control is turned to "On".	1. No current at motor.	(a) Check that current is reaching AC leads of changer. (b) Check that switch is closing. (c) Check wiring and soldered terminals in the changer.
	2. Motor defective.	(a) Remove turntable to allow motor to operate without load. If current is reaching motor and drive spindle does not rotate, the motor is defective. Repair or replace.
	3. Motor idler wheel not engaging turntable rim.	If drive spindle is turning but turntable is not: (a) Check motor idler assembly to determine if it is free to contact the drive spindle and turntable rim. (b) Wipe off inside rim of the turntable (2) to remove flock, or if oily, clean the turntable rim and rubber tire of the idler wheel with naphtha, or alcohol.
Changer does not cycle when the control knob is turned to the "Rej".	1. The manual reject not actuating the trip.	(a) Turn the control knob (20) to the reject position, hold and see that the control shaft assembly (58) has moved the trip link (82) to the rear. This should actuate the trip pawl on the main gear (76), which will bring the spur on the trip pawl in contact with the hub gear on the turntable hub. (b) Check for binding of the pawl lever (79), the trip lever assembly (81) and the trip pawl. If binding occurs, clean out all foreign matter and check for freedom.
Control knob cannot be turned to "On" position.	1. Machine shut off during cycle.	Turn the turntable clockwise, by hand, until the control knob (20) is free.
Pickup arm strikes records on spindle when it raises, or pickup arm rest when it moves out.	1. Pickup arm height not adjusted properly.	(See instructions for adjusting pickup arm height under "Adjustments").
Turntable speed too slow (refer to exploded view).	1. Binding in turntable bearing.	Check the turntable bearing for freedom. Hold the motor idler wheel out of engagement with the turntable and spin the turntable, by hand, to see if it turns readily and coasts for a long time. If binding occurs, remove turntable, clean off foreign matter, and lubricate with light mineral oil.
	2. Line voltage too low.	The line voltage should not be less than 105 volts or the turntable may be too slow.
	3. Operating temperature too low.	If the machine has been stored in a cold place or operated in surroundings at a temperature of less than 60° F., the turntable speed may be too slow.
Turntable stalls or slows down during cycle refer to exploded view).	1. Motor idler not engaging turntable.	(See "Turntable Does Not Revolve When Control Knob Is Turned to "On" Position").
	2. Binding in drive mechanism.	Hold idler away from turntable, or remove idler wheel. Cycle machine by turning turntable slowly by hand. The main gear should turn freely for the complete revolution without binding at any point. (a) If binding occurs, check for foreign matter in the gear teeth, a bent gear bearing, or bent spindle bushing. Straighten or replace. Clean and lubricate.

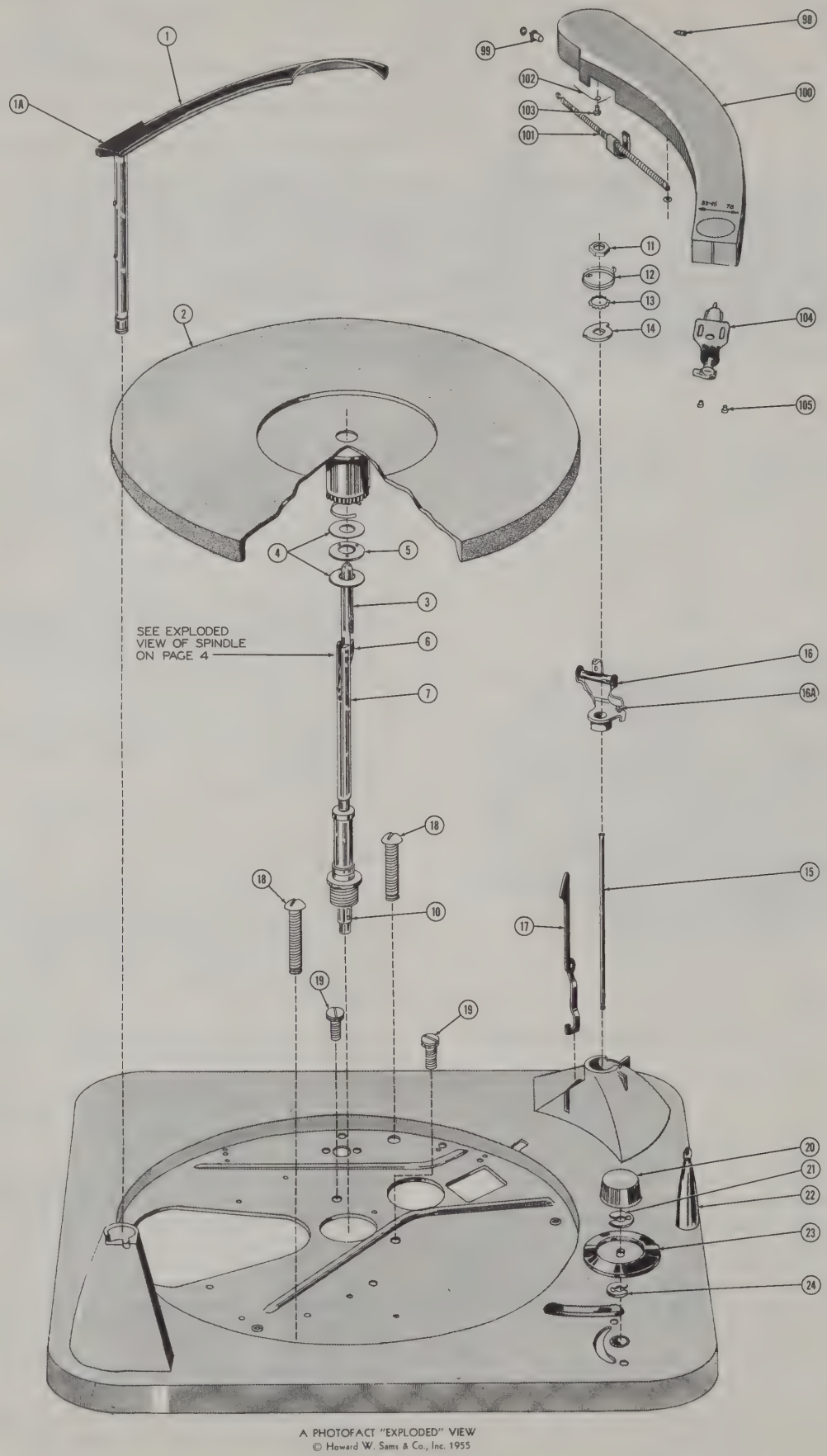

Figure 11A. Exploded View of Parts Above Baseplate.

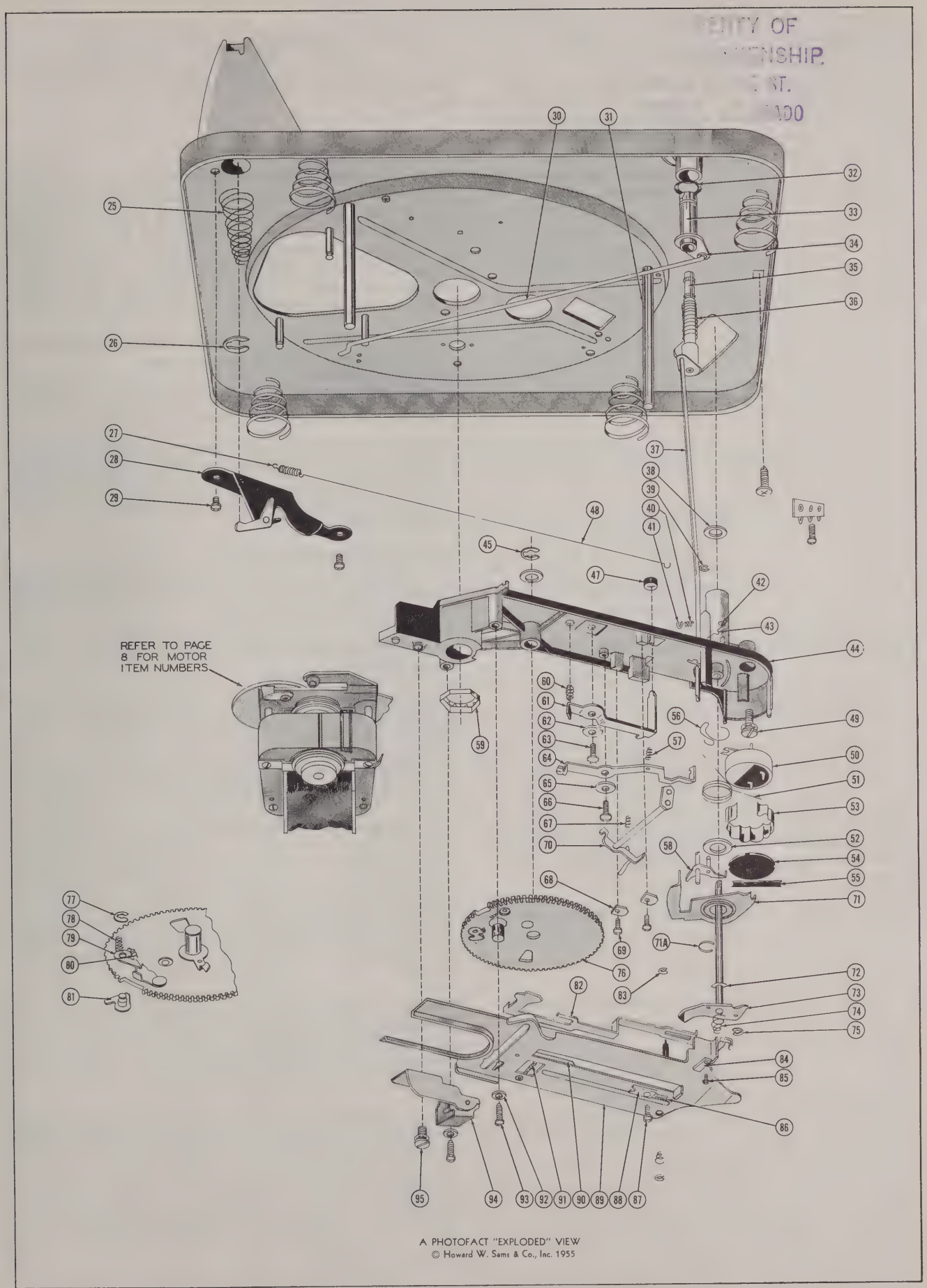

Figure 11B. Exploded View of Parts Below Baseplate.

TROUBLE CHART - Cont.

SYMPTOM	CAUSE	REMEDY
	3. Binding between pick-up arm lift pin (15) and lift pin cam surface on slide and cam assembly.	Lift pin should ride freely on cam surface without binding.
	4. Spindle pusher spring compressing too far.	Cycle the changer and watch the relationship between the bottom of the pusher housing and the lower button of the pusher housing. Just before the slide and cam (89) has completed its backward motion, the pusher housing should stop its upward motion and the lower button should continue up .005 to .047" more, slightly compressing the pusher spring. If the spring compresses to much, the changer may stall on the shut-off cycle.
	5. Motor weak.	When everything checks all right, but the changer still stalls in cycle, the motor may be weak.
	6. Grease on idler wheel.	1. Wipe off idler wheel rubber tire; inner rim of turn table and rubber belts with naphtha or alcohol.
	7. Turrets unseated from lock ring on turret shaft.	Remove turret and center lock ring. (If lock ring is distorted, replace with new lock ring). Replace turret and press down to assure turret of being locked to the turret shaft. (Turret will snap into position when properly locked).
	8. Idler slide bent.	Straighten and clean or replace.
	9. Idler wheel tension spring weak.	Replace spring or bend motor tension spring anchor bracket to give desired tension.
Changer continues to cycle.	Reject Mechanism binding.	(a) Make certain the trip link (82) is not frozen in the reject position. (b) Make certain the changer control lever (58) is not binding and that it actuates the trip link (82) when the changer control knob (20) is turned to reject. (c) Check for binding of trip pawl, trip lever (81) and pawl lever (79); these must be free to turn easily. (d) Check the changer control linkage, (37) and (58).
Noise during playing of record.	1. Motor rumble.	If a low-pitched rumbling sound comes from the loud speaker while a record is being played, check motor grommets to be sure the motor is freely suspended on them. The motor lead wires should have slack to allow the motor to float. Motor rumble may also come from an unbalanced motor rotor; in this case, replace the motor.
	2. Defective turntable bearings (5).	Defective turntable bearings can cause rumble. Check for foreign matter in the bearing, defective balls, binding between balls and ball retainer; rough surface on washers. Clean ball bearing, sleeve bearing, and washers; lubricate with light mineral oil.
	3. Defective motor idler wheel or speed pulleys.	A rapid thumping sound while the motor is running may indicate a flat spot on the motor idler wheel or speed pulleys. If this condition does not clear up after ten minutes of running time, remove the turntable and check the rubber tire on the idler or pulleys. If the surface of the rubber tire is not smooth and even, replace the part. Should the bearing of the idler wheel show signs of excessive wear or be extremely wobbly, the idler wheel should be replaced.
	4. Defective record.	Worn or defective records cause needle scratch and distortion of the recorded sound. If the record is warped,

TROUBLE CHART - Cont.

SYMPTOM	CAUSE	REMEDY
		it may slip on the other records causing "Wow" (a waver in the recorded sound). An enlarged hole in the record can also cause "Wow".
	5. Turntable scrapes.	If a scraping sound occurs as the turntable revolves, check: (a) Turntable warped, causing outer rim to rise and fall. (b) Motor idler or mounting plate bent.
	6. Squeaks.	Squeaking sound as changer operates indicates lack of oil. Lubricate points indicated under "Lubrication".
	7. Pulleys on motor not properly seated.	Check that pulleys are properly seated.
	8. 7" lever (61) loose.	Check 7" lever washer (62) and screw (63) to see if they are tight.
Distortion of Recorded Sound.	1. Defective record.	(See "Noise During Playing of Record").
	2. Defective amplifier.	Check phonograph amplifier and speaker.
	3. Bad cartridge.	Replace.
No Sound During Playing.	1. Defective cartridge.	Replace. (See "Defective Cartridges").
	2. Defective wiring.	Check pickup leads for a shorted or open lead.
	3. Defective amplifier.	Check phonograph amplifier and speaker.
	4. Loose cartridge terminal clips.	Remove, squeeze together slightly, and replace.
Excessive Record Wear.	1. Binding on pickup arm.	(See "Needle Does Not Track Across Record Properly").
Changer does not shut off after last record has been played (refer to exploded view).	1. Record support binding (1).	The record support must drop below the off-set shoulder of the spindle or the changer will not shut off. (See "Two Records Drop at Once").
	2. Lever assembly binding (70).	Clean out dirt and make sure this operates smoothly.
	3. Control link broken (48).	Replace.
	4. Spring (27) loose or broken.	Replace.
	5. Shut-off lever binding.	Check lever and if bent, straighten.
Rough pickup arm motion.	1. Horizontal defects.	(a) Check pickup arm return locator (71) for tightness. (b) Check that pickup arm return spring (51) is not weak and is hooked up properly. (c) Check that fiber washer (52) is installed under pickup arm return locator.
	2. Vertical defects.	(a) Lift pin (15) binding; clean out dirt and lubricate. (b) Slide and cam (89) binds; check bearing points -- clean and lubricate.

TROUBLE CHART - Cont.

SYMPTOM	CAUSE	REMEDY
		(c) Burrs in main slot in slide and cam (89) -- remove with fine file. (d) Ejector lever on ejector bracket assembly (94) binding in slide and cam slot; straighten, remove burrs, and lubricate. (e) Pickup arm shaft and sleeve binding; clean and lubricate.
Noise during change cycle.	1. Tines on the forked end of the slide and cam assembly (89) bent.	Replace.
	2. Lack of lubrication Grinding noise.	Lubricate ejector lever (94) where it contacts lower end of spindle (3).
Control knob does not detent on "33", "45", or "78" positions.	1. Bent parts.	(a) Insure that forked shaped stamping under idler is catching in detent notch. Straighten or replace motor. (b) Insure that speed control arm (34) and speed control rod (30) are not bent.
Cartridge drags on record.	1. Needle bent.	Replace needle.
	2. Cartridge mounting screws loose.	Tighten.
Shuts off when last record drops.	1. Shut-off bracket (28) bent.	Straighten or replace.
	2. Record support bent.	Bend down slightly so record support (1) is parallel with the base plate.
	3. Shut-off link (48) bent.	Straighten or replace.
	4. Loose bearing (68) on shut-off lever assembly (70).	Tighten.
Will not play manually.	1. Trip link (82) bent.	Straighten or replace.
	2. Trip finger cam (73) bent.	Straighten or replace.
Impossible to adjust set-down.	1. Pickup arm shaft and sleeve assembly (73) defective.	Shift the safety plate (14) toward the eccentric set-down adjusting screw (16A), and tighten pickup arm shaft and sleeve nut (11). Hold pickup arm against rear stop and push on trip finger cam (73). The safety plate (14) should move away from the set-down adjusting screw (16A) and snap back when the trip finger cam (73) is released; if it does not, replace the pickup arm shaft and sleeve assembly (73). Hinge pivot screws may be adjusted favoring one side or the other.
Record does not drop when changer cycles.	1. Spindle pusher shaft and housing assembly (10) broken.	If the pusher shaft (inside the spindle) is broken, the lower end (housing) will drop out of the spindle (7) (see Figure 5). Loosen spindle nut (59) and remove spindle (3). Replace with new spindle unit.
	2. Record pusher (6) in spindle not moving far enough forward to eject a record.	The record pusher should move up inside the spindle body (7), then move forward until it has reached a point flush with, or a maximum of, .010" beyond the spindle body (7). To insure that the record pusher (6) is all the way forward, the lower button on the shaft and housing assembly (10) should be raised high enough by the ejector lever to

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SYMPTOM	CAUSE	REMEDY
		slightly compress the pusher spring inside the pusher shaft and housing assembly (10). (See "Turntable Stalls During Cycle"). If the spring is compressed and the record pusher (6) does not move far enough forward to eject a record, the spindle (3) should be replaced. If a record is not pushed completely off the ledge, it may hang on the spindle momentarily, then drop on the pick-up arm when it moves in over the turntable.
	3. Record pusher (6) raises outside the spindle body (7).	When changer cycles, the record pusher (6) should rise up just inside the spindle body, then move forward inside the center hole in the record. If the record pusher (6) rises outside the spindle body (7), it will raise the record instead of pushing it off the spindle ledge. Remove the spindle (3) and replace with a complete new spindle assembly.
Two records drop at once (refer to exploded view and Figure 5).	1. Hole in record too large.	Check the diameter of the hole in the record. An oversize hole will cause two records to drop at once.
	2. Spindle guide not fully down.	If the spindle guide is not all the way down, more than one record may be dropped at a time. (a) Check the guide to be sure it is free and does not bind at any point. Clean out foreign matter of straighten if necessary. Do not oil. (b) When records are placed on the spindle, be sure the guide is all the way down. The guide will normally raise as a record is being dropped, but it should return to place immediately, by gravity.
	3. Record pusher (6) defective.	The record pusher (6) may be deformed, etc. This may cause two records to drop at once. Replace with new pusher or replace spindle assembly.
	4. Slight play in spindle (3).	Tighten spindle nut (59). If stripped, replace.
Record hits pickup arm (refer to exploded view).	1. Record pusher (6) not moving far enough forward to eject record.	(See "Record Does Not Drop When Changer Cycles"-2).
	2. Record pusher (6) extending beyond outside diameter of spindle.	Cycle changer, by hand, until pusher shaft and housing assembly (10) is at the top of its travel. Using new record as a gauge, pass it over the spindle to see if it binds at any point. File off high points on record pusher (6), with a fine file, until record will pass freely over spindle.
	3. Pickup arm not adjusted properly.	(See "Adjustments").
Needle does not set down on 10" record in proper position (refer to exploded view).	1. Pickup arm not adjusted properly.	(See "Adjustments"). (a) Loose nut (11) on pickup arm shaft and sleeve (73).
	2. Pickup arm shaft and sleeve (73) binding.	File off burrs and rough surfaces. Polish and lubricate shaft.
	3. 7" set-down lever (61) and 12" record selector (17) not operating properly.	Insure that the proper operation and reset of the 7" set-down lever (61) and 12" record selector (17) is not being interfered with.
	4. Needle bent.	Replace with new needle.

TROUBLE CHART - Cont.

SYMPTON	CAUSE	REMEDY
	5. Wire spring (43) broken.	12" record selector (17) does not cock; check for broken 12" record selector spring (43).
	6. Bent pickup arm return locator (71).	Straighten or replace.
	7. Bent trip finger cam (73).	Straighten or replace.
Needle does not set down on 12" record in proper position (refer to exploded view).	1. Diameter of 12" record undersize.	The set-down position of the needle for 12" records is determined by the edge of the record striking the 12" record selector (17). If a 12" record has a diameter of less than the standard size of 11-7/8" plus or minus 1/32", it may fail to depress the 12" record selector far enough.
	2. Enlarged center hole in record.	An enlarged center hole might fail to set the 12" record selector because it could produce the same effect as a small record.
	3. Pickup arm not adjusted properly.	(See "Adjustments") Page 8.
	4. Binding of pickup arm shaft and sleeve (73).	Clean and polish shaft (73), and lubricate with light oil.
	5. Reset lever spring (57) broken.	Replace spring (57).
	6. 12" record selector spring (43) broken.	Replace spring (43).
	7. 12" record selector (17) binding.	The 12" record selector must be free to operate smoothly. Clean out dirt and straighten if bent, or replace.
	8. Bent pickup arm return locator (71).	Straighten or replace.
	9. Bent trip finger cam (73).	Straighten or replace.
Needle does not set down on 7" record properly.	1. 7" set-down lever spring (67) broken or weak.	Replace.
	2. Pickup arm not adjusted properly.	(See "Adjustments") Page 8.
	3. 7" set-down lever screw (63) loose.	Tighten.
	4. 7" set-down lever (61) hitting frame or baseplate when it goes through hole in frame.	Straighten or replace.
	5. Reset lever (64) bent.	Replace.
	6. 7" set-down lever (61) does not fall into opening in main gear.	Replace.
	7. Bent pickup arm return locator (71).	Straighten or replace.
	8. Bent trip finger cam (73).	Straighten or Replace.

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TROUBLE CHART - Cont.

SYMPTOM	CAUSE	REMEDY
Changer does not cycle when record has been played.	1. No finishing trip groove on record.	Check record for eccentric trip groove in center of record. Some old records and home recordings do not have this eccentric trip groove.
	2. Needle jumps out of grooves in record.	(a) Check trip pressure; the lateral pressure should not exceed 3 grams. (If pressure is excessive, see "Changer Trips Before Needle Reaches End of Record"). (b) The record may be defective; the finishing groove is often too shallow. Check with a record that is known to be good. (c) The needle point may be damaged or affected by an excessive accumulation of dust, lint, etc.; check needle pressure as described under "Adjustments". (d) There may be binding in the pickup arm shaft and sleeve assembly (73) or between the pickup arm return locator (71) and the trip finger cam (73); (see "Needle Does Not Track Properly Across Record").
	3. Trip pawl binding on gear face.	The trip pawl must be free to move forward and engage the boss on the turntable hub when the trip lever releases it. Check for burrs or foreign matter lodged between the trip pawl and main gear (76). Do not oil as this might collect dirt and gum up the pawl.
	4. Trip finger cam (73) bent.	Straighten or replace.
	5. Trip link (82) bent.	Straighten or replace.
Changer trips before needle reaches end of record.	1. Hole in record too large.	If the hole in the record is too large, the groove may turn eccentric with the spindle and cause premature tripping.
	2. Binding of trip link (82).	With the trip link released, check the trip link for freedom of motion. It should be free to move without binding.
Needle does not track across record properly.	1. Needle may be clogged by accumulation of lint, dirt, etc., or worn.	(a) Clean foreign material from around needle. (b) Check needle to see if the tip is bent or broken. Replace, if necessary.
	2. Trip finger cam (73) does not disengage from the pickup arm return locator (71) when cycle is completed.	There should be a 1/32" gap between the trip finger cam (73) and the pickup arm return locator (71) when the machine is not in cycle. If the gap is small enough to allow the parts to touch and bind as the needle moves across the record, the compression spring washer (72) may be weak or broken. Replace.
	3. Check the bearing in the pickup arn post for binding.	(a) Check pickup arm return locator (71) and trip finger cam (73) for binding. (See 2 above).
	4. Changer not level.	(See "Leveling Record Changer") Page 2.
	5. Pickup leads too tight.	Give the pickup leads enough slack to allow the tone arm to move freely across a record.

PARTS LIST

Ref. No.	Part No.	Description
1	5277-H	Record Support Assembly
1A		2903G Plastic Button
2	5116H	Turntable and Hub Assembly
3	3668	Spindle and Bearing Assembly-Consists of 3667 Spindle Assembly less Ball Race and Washers
4		2639 Bearing Washer
5		2624 Bearing (Ball Race)
6		1529 Record Pusher
7		2537 Spindle Body and Base Assy.
8		1527 Pusher Spring
9		2552 Pusher Shaft Spring
10		2539 Pusher Shaft and Housing
11	3887	Jam Nut
12	4937	Safety Spring
13	3888	Lockwasher
14	4339	Safety Plate
15	4327	Lift Pin
16	4072	Hinge Arm Assy.
17	2957	12" Record Selector
18	5612	Mounting Bolts
19	101	Screw - 10-24 X 5/16Casting Holddown and Lockwasher
20	2907G	Reject Knob
21	1651	"C" Washer - Switch Control
22	5573G	Tone Arm Rest Post
23	4503G	Speed Control Knob
24	2594	"C" Washer - Switch Control
25	2546	Record Support Holddown Spring
26	2110	"C" Washer - Record Support Assy.
27	4016	Shut Off Spring
28	4398	Shut-off Bracket Assy.
29	2053	Screw - 6 X 5/16
30	2942	Motor Speed Control Rod
31	4577	Changer Support Leg
32	2909	Spring Washer
33	2597	Control Shaft Assy. - Motor
34	2765	Rubber Grommet
35	2599	Switch Control Lever Assy.
36	2910	Compression Spring
37	2600	Shut-off Rod
38	2952	Fiber Washer
39	1652	"C" Washer for Item 58
40	4172	Compression Spring for Item 17
41	1588	"C" Washer for Item 17
42	1720	Speed Nut for Item 43
43	2563	Spring - 12" Record Selector
44	4330	Die-Cast Frame
45	1719	"C" Washer - Main Gear Assy.
47	2580	Rubber Bumper
48	2935	Control Link
49	101	Screw - 1-24 X 5/16 and Lockwasher
50	467	Switch
51	4938	Return Spring - Tone Arm
52	4950	Fiber Washer
53	2931	Fiber Insulating Strip
54	2573	Switch Cover
55	4212	Retainer - Switch Cover Hold Down
56	3901	Reject Spring
57	2925	Spring - Reset Lever
58	2284	Control Shaft Assy.
59	2208	Pal Nut for Spindle
60	2579	Spring - 7" Set-down Lever
61	2581	7" Set-down Lever
62	492	Washer - Flat Steel - 7" Set-down Lever
63	4856	Screw - 6-32 X 1/4-7"
64	2560	Reset Lever
65	492	Washer - Flat Steel - Reset Lever
66	4856	Screw 6-32 X 1/4 - Reset Lever
67	2579	Spring for Shut-off Lever
68	4947	Lever Assy. Bearing
69	2932	Screw 4-40 Hex. Head
70	4013	Lever Assy. - Shut-off
71	2561	Locator Plate - Tone Arm Return
71A	2271	Retaining Ring - Locator Plate
72	2953	Spring Washer
73	4331	Trip Finger Cam and Shaft Assy.
74	3962	Lift Pin Spring
75	1588	"C" Washer - Lift Pin Spring
76	5418	Main Gear Assy.
77		1588"C" Washer - Trip Lever Assy.
78		4172 Spring
79		5339 Pawl Lever
80		5338 Spring
81		2569 Trip Lever Assy.
82	2958	Trip Link
83	1588	"C" Washer-Slide Retainer
84	3915	Slide Support
85	2932	Screw 4-40 Hex. Head
86	2295	Spring - Slide Bearing
87	4856	Screw 6-32 X 1/2
88	2295	Slide Bearing
89	5587	Slide Assy.
90		Escape Lever (Part of Item 89)
91	2585	Escape Lever Spring
92	2274	Flat Washer
93	4856	Screw 6-32 X 1/4 - Slide Assy.
94	2571	Ejector Link Assy.
95	101	Screw 10-24 X 5/16 and Lockwasher
96	4856	Screw 6-32 X 1/4
97	7752-38	Terminal Strip
98	3727	Hinge Pivot Screw
99	4922	Hinge Button Bearing
100	6133-AF	Tone Arm
101	3964	Spring and Dampener Assy.
102	3736	Lock Spring
103	2912	Lift Screw
104	7669	Cartridge and Bracket Assy.
105	2631	Cartridge Mounting Screws
106	7340	Motor (Alliance)
107		3481 Idler Wheel
108		3487 Idler Spring
109		6011 Idler Arm & Pivot Assy.
110		3484 Pulley -"78" R. P. M.
111		3483 Pulley -"45" R. P. M.
112		3482 Pulley -"33 1/3" R. P. M

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MODEL TV1-9017A

CORONADO MODELS
TV1-9017A, B, TV1-9135A, B

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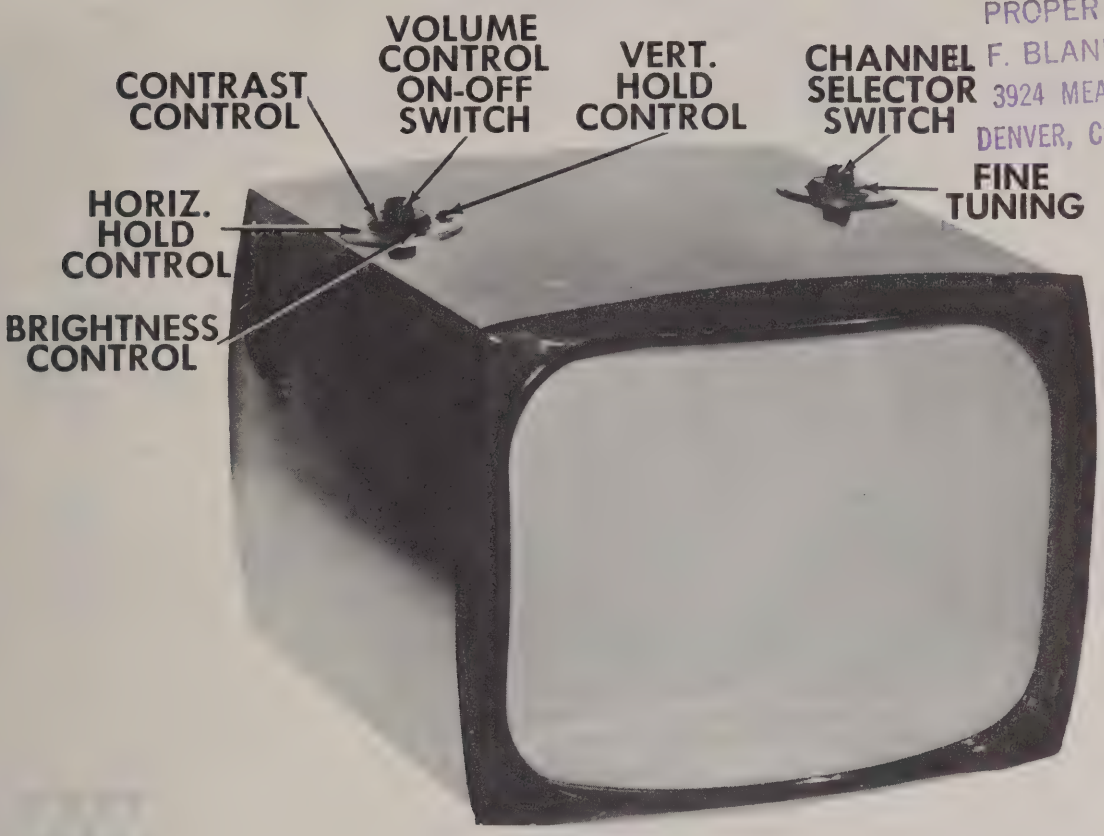

CORONADO MODEL TV1-9017A

TRADE NAME	Coronado Models TV1-9017A, B, TV1-9135A, B
SUPPLIER	Gamble-Skogmo Inc., 15 North Eighth Street, Minneapolis, Minn.
TYPE SET	Television Receiver
TUBES	Fifteen
POWER SUPPLY	105-115 Volts AC - 60 Cycle RATING 1.38 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 26.75MC, Sound IF 22.25MC (Intercarrier)

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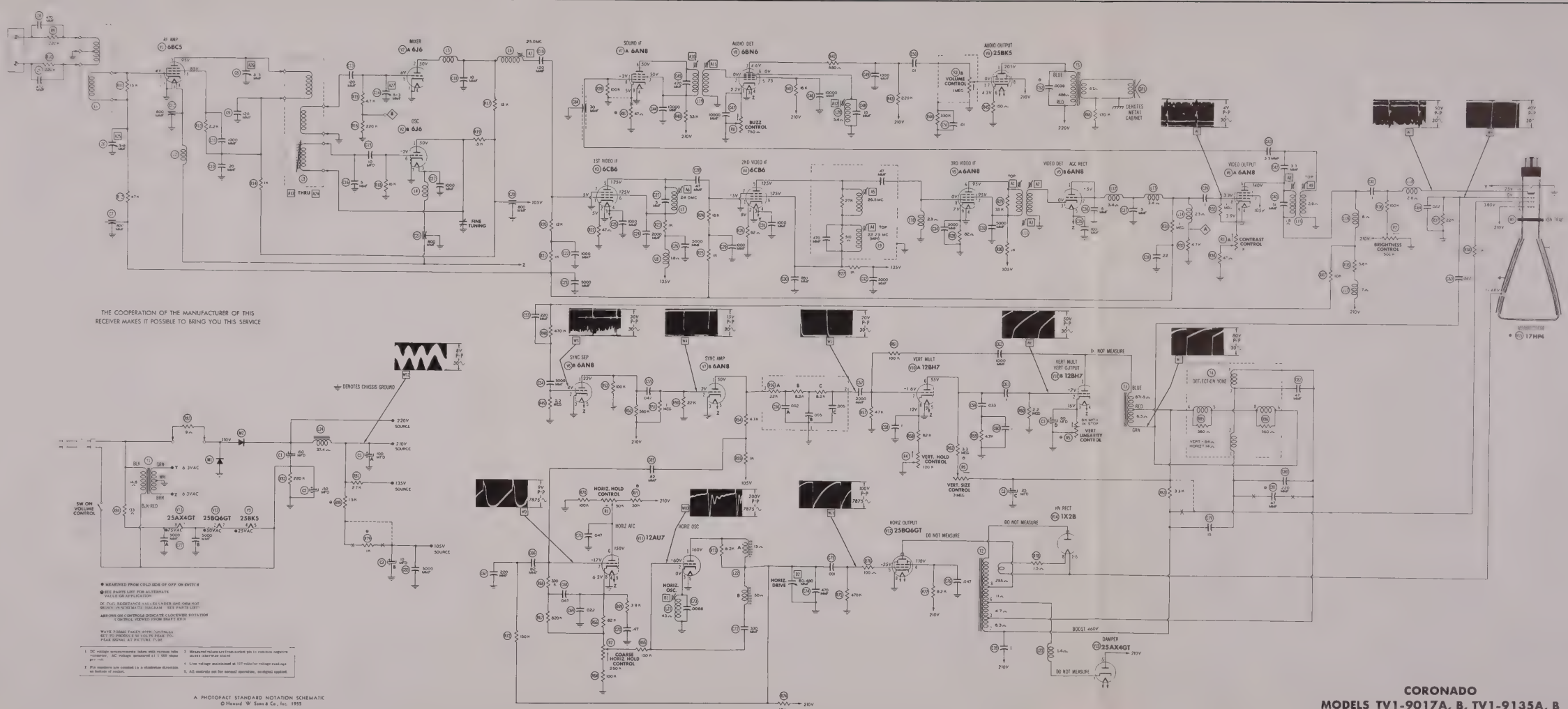

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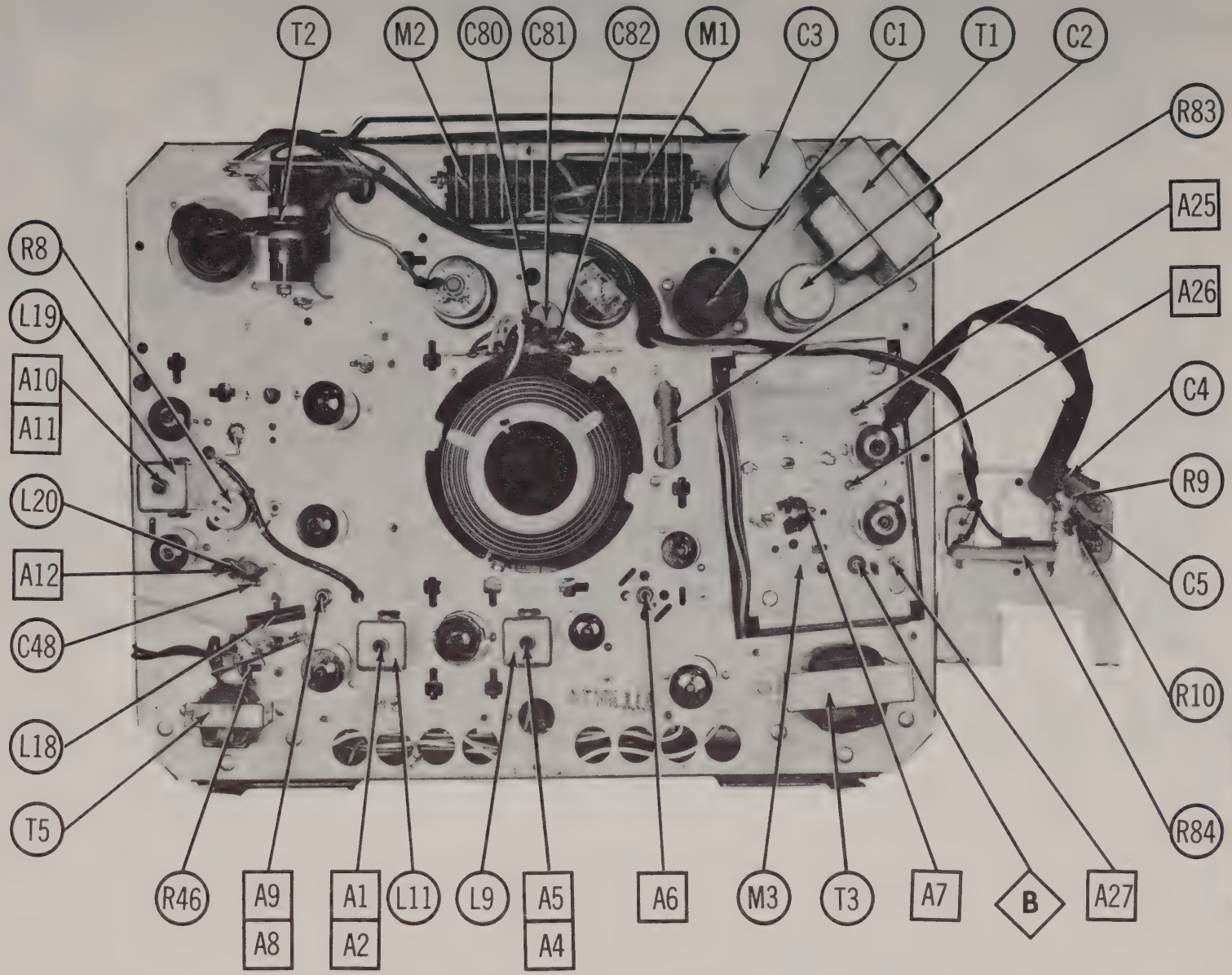

CHASSIS TOP VIEW

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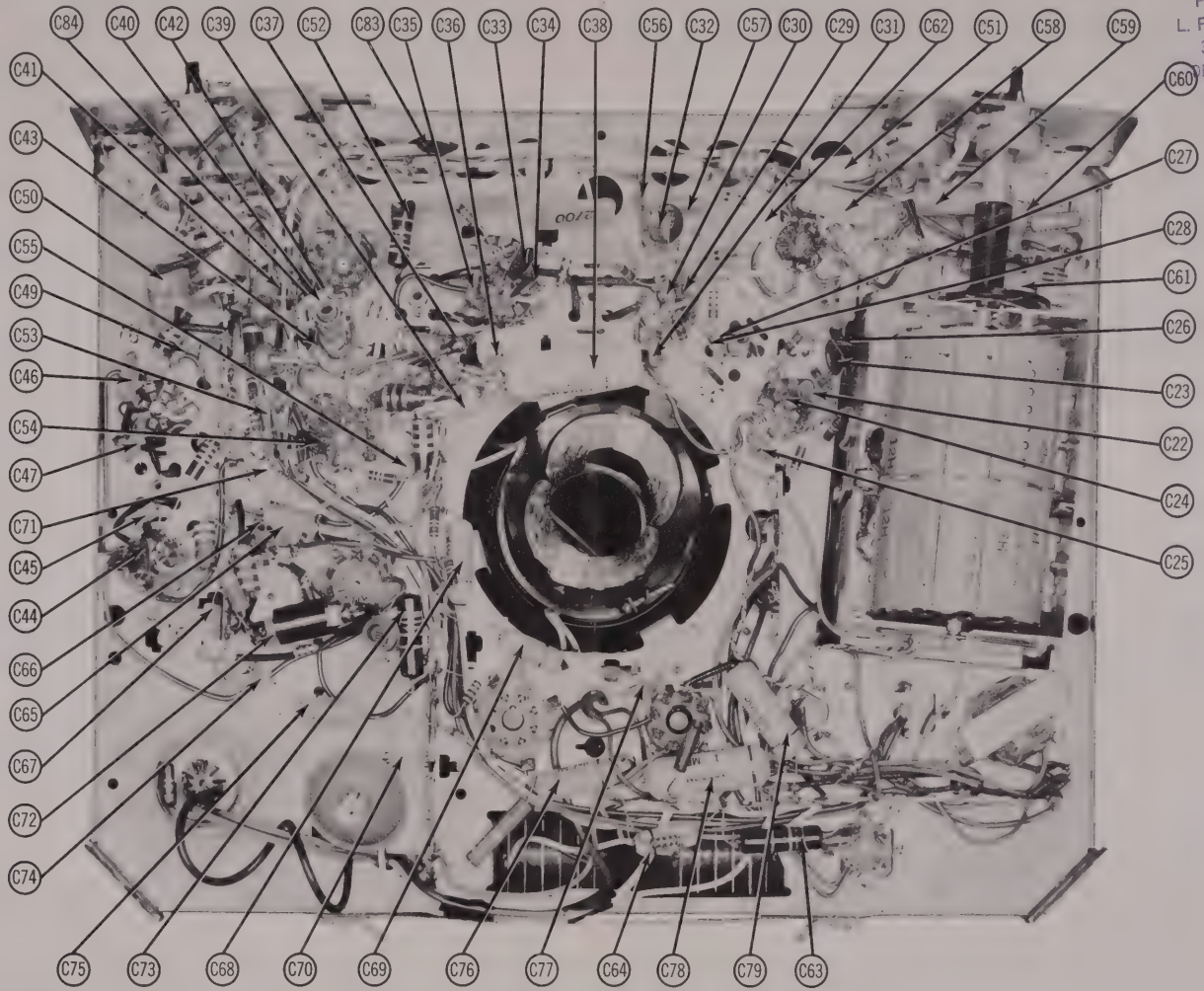

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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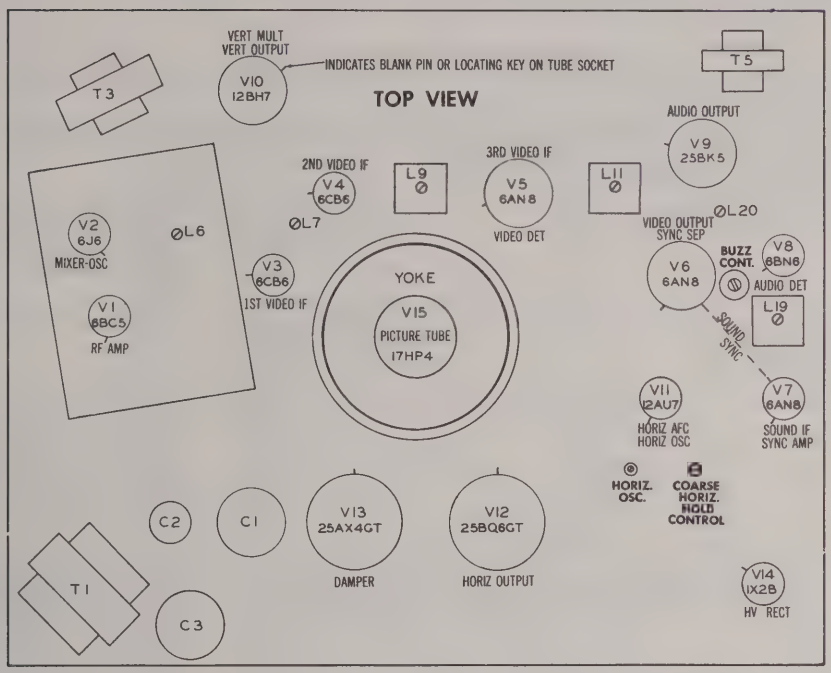
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

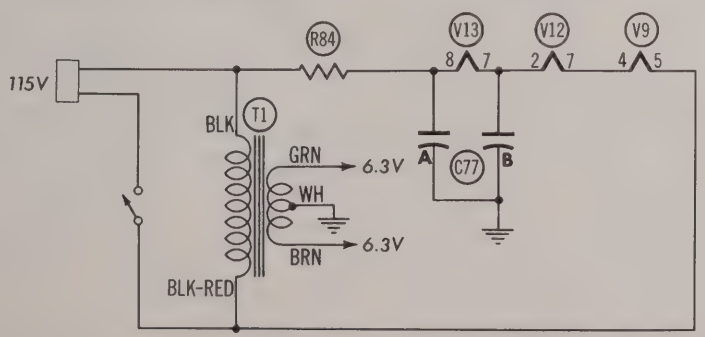
POWER SUPPLY FAILURE
No raster, no sound - **Selenium Rectifiers (M1 & M2)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V15**
Has pic, no sound - **V7, V8, V9**

SYNC FAILURE
No vert. sync - **V7, V10**
No horiz. sync - **V7, V11**
No vert. or horiz. sync - **V6, V7**

SWEEP FAILURE
No raster, has sound - **V11, V12, V13, V14, V15**
No vertical deflection - **V10**
Poor vert. linearity or foldover - **V10**
Poor horiz. linearity or foldover - **V11, V12, V13**
Narrow picture - **V11, V12, V13, V14, M1, M2**
Vert. off freq. - **V7, V10**
Horiz. off freq. - **V7, V11**

NOTE: Since this receiver employs tubes used in series-parallel filament network, an open filament in any tube in series may cause the set to be inoperative. (See circuit below).



SET 276 FOLDER 5

CORONADO
MODELS TV1-9017A, B, TV1-9135A, B

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube (V11) to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect a .001MFD capacitor across the vertical input terminals of oscilloscope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to pin 8 (grid) of 6AN8 (V5). Low side to chassis.	25MC (10MC Swp)	23.9MC 26.3MC	Any	Vert. amp. thru 10KΩ to point (A). Low side to chassis.	A1 A2 A3	Connect a short jumper from pin 5 (plate) to pin 6 (screen) of 6CB6 (V4). Adjust for response similar to Fig. 1 with markers at 90%. A3 is a coupling rod and affects band width. Remove short from pin 5 to pin 6 of V4.
2.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	Not used	22.25MC (Unmod.)	"	Use VTVM DC probe to point (A). Common to chassis.	A4	Adjust for minimum deflection.
3.	"	"	"	26.5MC	"	"	A5	Adjust for maximum deflection. Attenuate generator output to maintain not more than 2 volts at VTVM. Repeat step 2.
4.	"	"	"	24.0MC	"	"	A6	Adjust for maximum deflection. Attenuate generator output to maintain not more than 2 volts at VTVM.
5.	"	"	"	25.0MC	"	"	A7	"
6.	"	"	25MC (10MC Swp)	21.3MC 23.8MC 26.65MC	"	Vert. amp. thru 10KΩ to point (A). Low side to chassis.		Check for response curve similar to Fig. 2. Rock A7 for flat response. Increase sweep generator output and use high scope gain to view 22.25MC trap region. Adjust A4 so that 21.3MC occurs at peak of pop-up portion preceeding trap notch. 22.25MC should fall in trap notch. If response obtain is not similar to Fig. 2, repeat steps 1 thru 6.

SOUND IF ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
Tune in a TV signal and adjust the fine tuning control until sound bars just appear in the picture. Adjust A8 fully counter clockwise, then clockwise until the horizontal scanning lines are smooth and continuous. Readjust the fine tuning control for clearest picture and best sound.
Insert an attenuator in series with the antenna and the receiver antenna terminals so that the signal strength may be varied from weak to strong. If a suitable attenuator is not available stray feed the signal to the receiver by placing the antenna lead-in near the antenna terminals.
Reduce the signal input to the receiver so that the signal falls below the limiting level of the 6BN6 limiter-detector as evidenced by a "hiss" in the sound. Adjust the secondary of the sound take-off transformer (A9), the sound IF transformer (A10 and A11), the quadrature coil (A12) and the buzz control (R8) for maximum sound and minimum buzz. If hiss disappears while adjusting increase attenuation until hiss reappears.

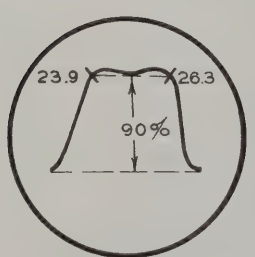


FIG. 1

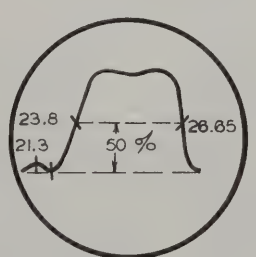


FIG. 2

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ALIGNMENT INSTRUCTIONS (cont)

OSCILLATOR ALIGNMENT

The channel oscillator adjustment screws are reached thru a hole just to the left of the fine tuning shaft. The correct oscillator adjustment screw is accessible thru this hole as the channel switch is turned to each channel. Connect the negative lead of a 1.5 volt bias battery to the ungrounded side of C38.
Connect the positive side to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω carbon resistors.	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp)	193. 25MC 197. 75MC	10	Vert. amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A13	Adjust to place sound marker in trap notch as in Fig. 3. Use high scope gain and increase sweep generator output to view trap region. Video marker should fall at 50% on response curve.
			213MC (10MC Swp)	211. 25MC 215. 75MC	13		A14	
			207MC (10MC Swp)	205. 25MC 209. 75MC	12		A15	
			201MC (10MC Swp)	199. 25MC 203. 75MC	11		A16	
			189MC (10MC Swp)	187. 25MC 191. 75MC	9		A17	
			183MC (10MC Swp)	181. 25MC 185. 75MC	8		A18	
			177MC (10MC Swp)	175. 25MC 179. 75MC	7		A19	
			85MC (10MC Swp)	83. 25MC 87. 75MC	6		A20	
			79MC (10MC Swp)	77. 25MC 81. 75MC	5		A21	
			69MC (10MC Swp)	67. 25MC 71. 75MC	4		A22	
			63MC (10MC Swp)	61. 25MC 65. 75MC	3		A23	
			57MC (10MC Swp)	55. 25MC 59. 75MC	2		A24	

RF AND MIXER ALIGNMENT

Leave the bias battery connected as under "Oscillator Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω carbon resistors.	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp)	193. 25MC 197. 75MC	10	Vert. amp. thru 10KΩ to point Ⓑ. Low side to chassis.	A25, A26, A27	Adjust for response curve similar to Fig. 4 with markers above 90%.
9.	"	"	69MC (10MC Swp)	67. 25MC 71. 75MC	4	"		Check for response curve similar to Fig. 4. If markers fall below 70% on any channel, make slight compromise adjustments of A25, A26 and A27 with channel switch set to that channel. Recheck all other channels to see that they have not been seriously affected.
			213MC (10MC Swp)	211. 25MC 215. 75MC	13			
			207MC (10MC Swp)	205. 25MC 209. 75MC	12			
			201MC (10MC Swp)	199. 25MC 203. 75MC	11			
			189MC (10MC Swp)	187. 25MC 191. 75MC	9			
			183MC (10MC Swp)	181. 25MC 185. 75MC	8			
			177MC (10MC Swp)	175. 25MC 179. 75MC	7			
			85MC (10MC Swp)	83. 25MC 87. 75MC	6			
			79MC (10MC Swp)	77. 25MC 81. 75MC	5			
			63MC (10MC Swp)	61. 25MC 65. 75MC	3			
			57MC (10MC Swp)	55. 25MC 59. 75MC	2			

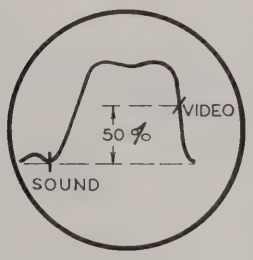


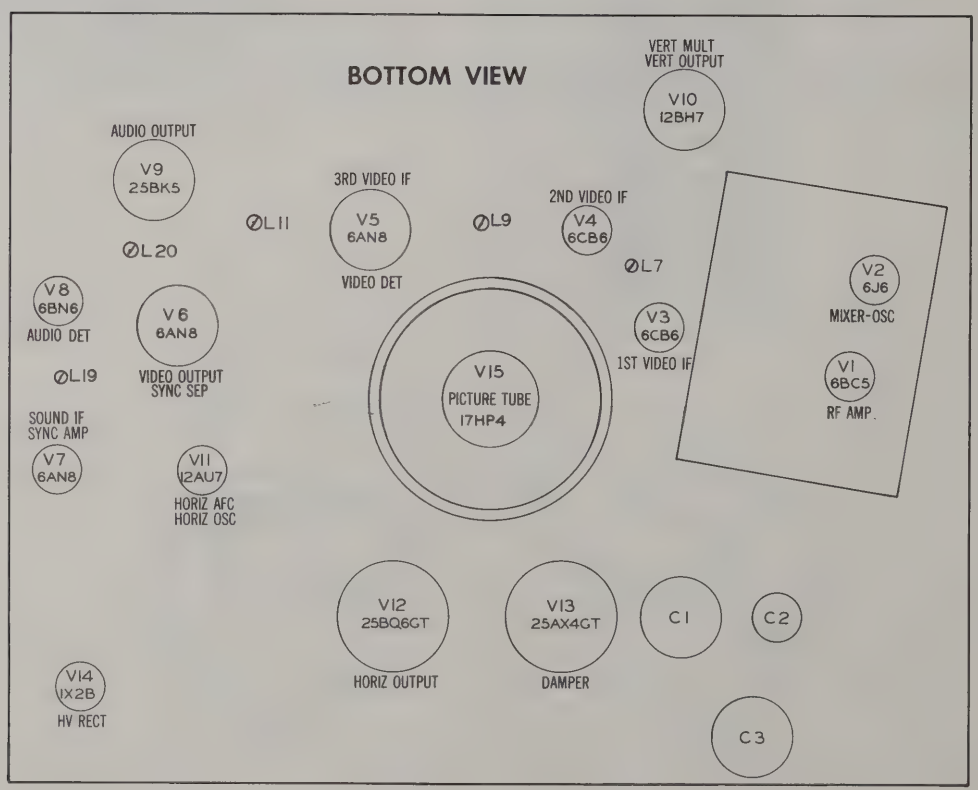
FIG. 3

FIG. 4

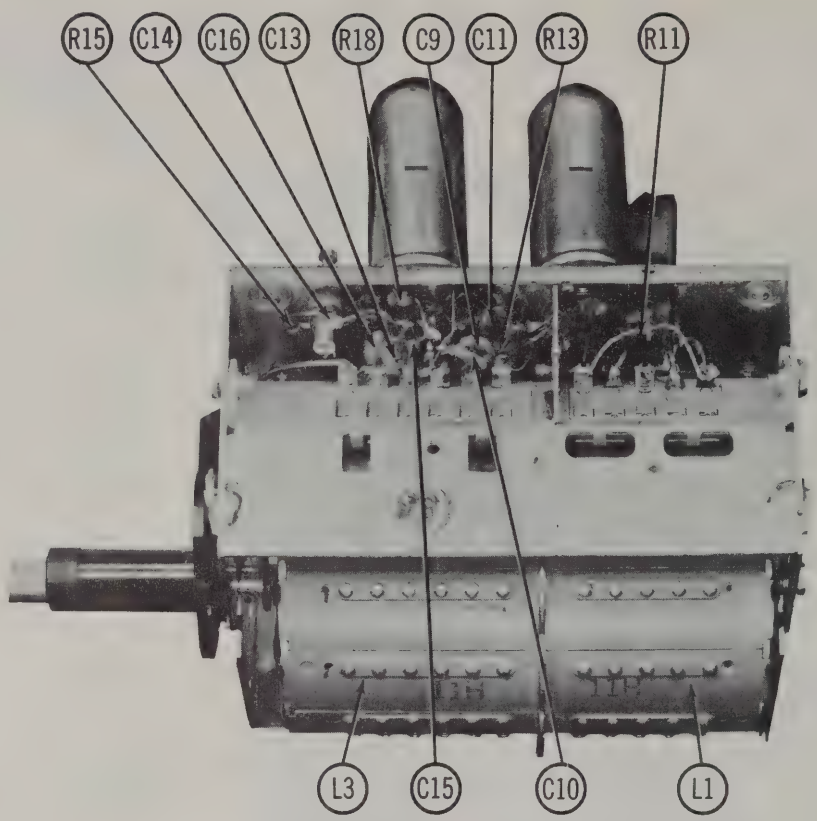
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BC5	1Meg	0Ω	0Ω	.1Ω	†3.5KΩ	†5.5KΩ	0Ω		
V 2	6J6	†17.5KΩ	†17.5KΩ	.1Ω	0Ω	225KΩ	10KΩ	0Ω		
V 3	6CB6	1Meg	47Ω	0Ω	.1Ω	†3.7KΩ	†3.7KΩ	0Ω		
V 4	6CB6	1Meg	62Ω	0Ω	.1Ω	†3.7KΩ	†3.7KΩ	0Ω		
V 5	6AN8	4.7KΩ	4.7KΩ	.2Ω	0Ω	.1Ω	†3.5KΩ	†3.5KΩ	2.3Ω	82Ω
V 6	6AN8	†120KΩ	2.2Meg	0Ω	0Ω	.1Ω	†5.6KΩ	†2.5KΩ	1Meg	300Ω
V 7	6AN8	†8.2KΩ	22KΩ	0Ω	0Ω	.1Ω	†33KΩ	†33KΩ	100KΩ	47Ω
V 8	6BN6	300Ω	.3Ω	0Ω	.1Ω	†18KΩ	5.4Ω	†220KΩ		
V 9	25BK5	†485Ω	INF	120KΩ	■22Ω	■0Ω	150Ω	120KΩ	†37Ω	INF
V 10	12BH7	▲4.5KΩ	2.2Meg	1KΩ	.1Ω	.1Ω	▲4.5Meg	47KΩ	120KΩ	0Ω
V 11	12AU7	†47KΩ	500KΩ	43Ω	0Ω	0Ω	†30KΩ	1.5Meg	400KΩ	.1Ω
V 12	25BQ6GT	INF	■39Ω	INF	†8.2KΩ	470KΩ	INF	■22Ω	0Ω	Top Cap ▲12Ω
V 13	25AX4GT	▲20Ω	INF	1Meg	INF	†37Ω	INF	■39Ω	■50Ω	
V 14	1X2B	PINS	1-8	HAVE	INFINITE	RESISTANCE				Top Cap ▲265Ω
V 15	17HP4	0Ω	22KΩ	Pin 6 †37Ω	Pin 10 ▲1KΩ	Pin 11 †100KΩ	Pin 12 .1Ω			

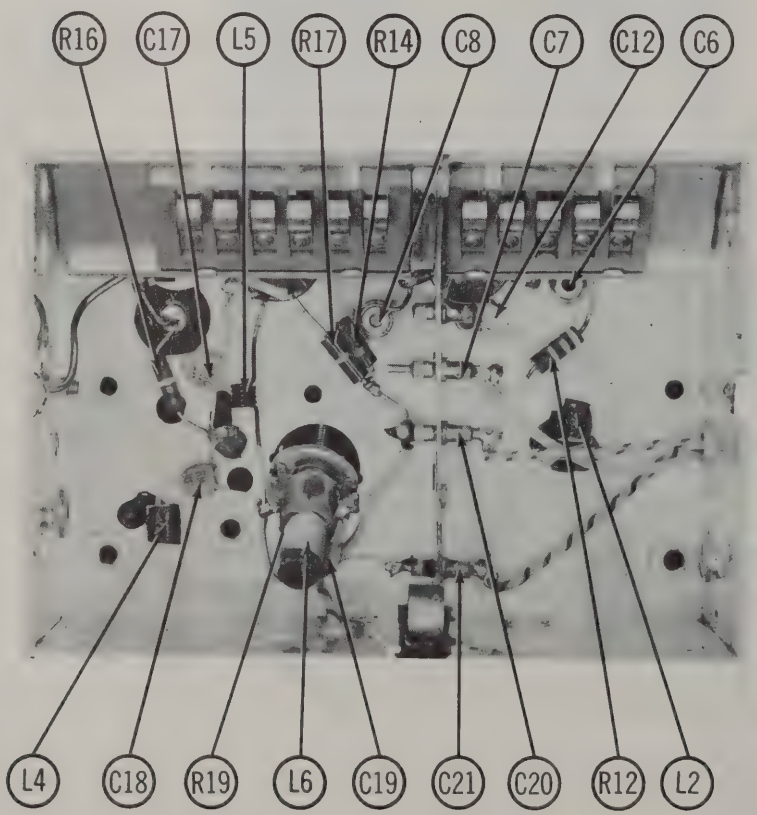
† MEASURED FROM OUTPUT OF M2.
▲ MEASURED FROM PIN 3 OF V13.
■ MEASURED FROM COLD SIDE OF OFF/ON SWITCH.



TUBE PLACEMENT CHART

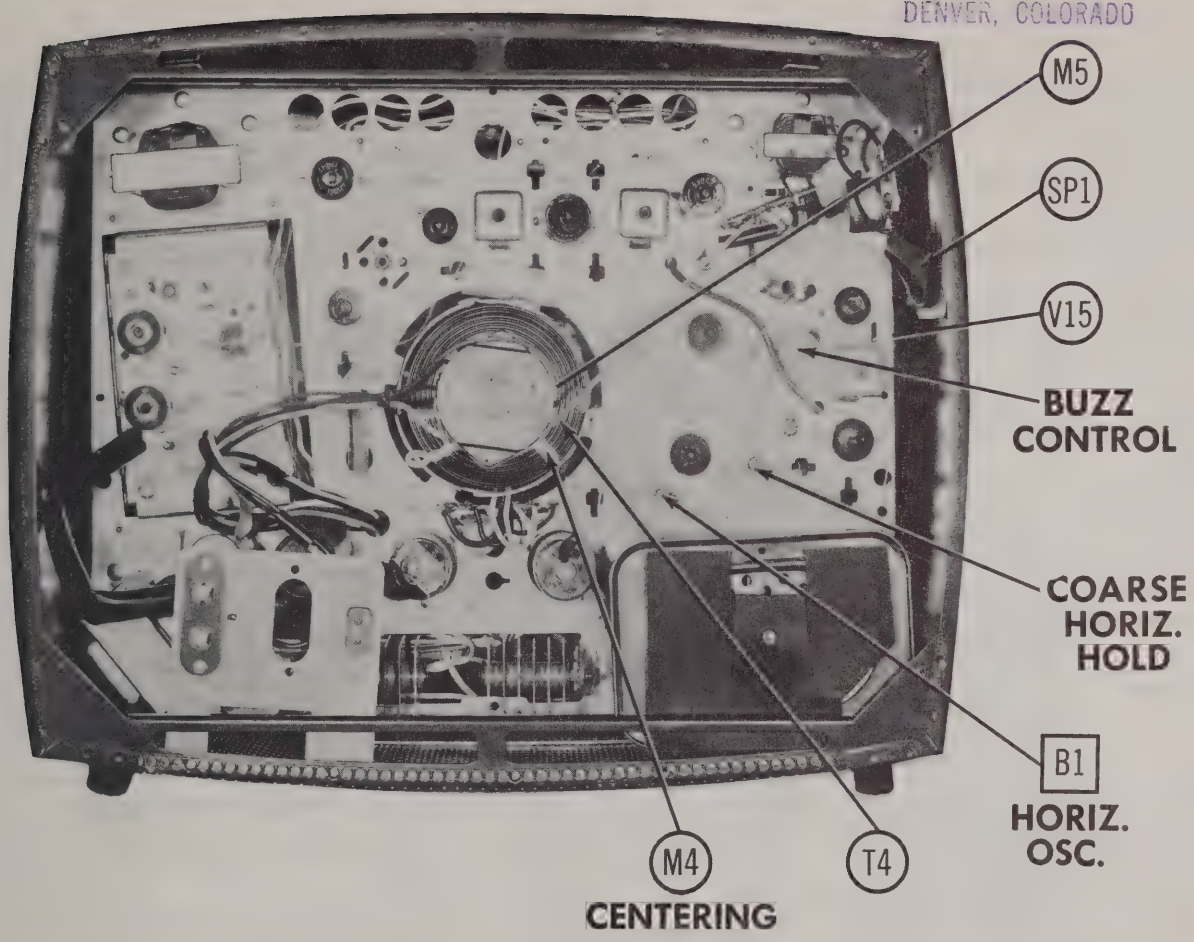


RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

1. Set the horizontal hold control to its mid-range position and adjust the coarse horizontal hold control (R7A) for a steady picture.

2. Turn the horizontal hold control fully clockwise then fully counter clockwise noting the number of diagonal bars present on the screen. Adjust R7A until an equal number of diagonal bars are present on the screen at the extreme settings of the horizontal hold control. If this condition cannot be obtained proceed with step 3.

3. Turn the horizontal hold control fully counter clockwise. Turn R7A fully clockwise. Turn the horizontal oscillator coil slug (B1) counter clockwise until a squegging condition (breakup of raster) appears. Turn B1 clockwise until squegging stops. Turn B1 an additional two turns in a clockwise direction.

4. Set horizontal hold control and R7A to their mid-range positions and adjust B2 until picture synchronizes horizontally. Recheck holding action as in 1. and 2. above.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V12 and V13. Check M1 and M2. Check T2, T4A, R77, C76 and other associated components.

DRIVE LINES

Check by substitution V12 and V13. Check adjustment B2. Check T2, T4A, C75, C74, R77 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V12 and V13. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V11, V12 and V13. Check C69 for open. Check L21, C73, R70 and other associated components.

XMAS TREE EFFECT

Check by substitution V11, V12 and V13. Check T2 and T4A for internal arcing. Check L21, L22, C73, C72, C71, R71, R73 and other associated components.

VERTICAL

LOSS OF SWEEP

Substitute V10. Check waveform W6.

If Satisfactory	If Unsatisfactory
Check T3, T4B, R63, C3C, and other associated components.	Check C61, C59, R62, R6 and other associated components.

INSUFFICIENT SWEEP

Substitute V10. Check vertical size and vertical linearity controls for proper operation. Check T3 and T4B.

COMPRESSED AT BOTTOM

Substitute V10. Check R6, R62, R59, C59 and other associated components.

COMPRESSED AT TOP

Substitute V10. Check R5, C3D, T3, T4B and other associated components.

FOLDS

Substitute V10. Check C59, C60, R59, R5 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V6 and V7. Check C53, C54, C55, R52, R55, R54 and other associated components.

LOSS OF VERTICAL SYNC - HORIZONTAL SYNC SATISFACTORY

Substitute V10. Check C57, C58, R4 and R58. Check vertical integrator network. Check video IF alignment for overloading.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISFACTORY

Substitute V11. Check C65, C68, C71, R70, R1 and other associated components.

HORIZONTAL BENDING

Check by substitution V6, V7 and V11. Check AFC network.

VIDEO

LOSS OF VIDEO

Substitute V6. Check C40, C41, L17, L16, R35 and other components associated with V6.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check video IF alignment.

POOR CONTRAST

Substitute V6. Check picture tube, contrast control, L14, R34 and other associated components.

NEGATIVE PICTURE

Substitute V6. Check video detector network, picture tube, C41 and other associated components.

SMEAR

Substitute V6. Check L17, L13, L12, C41, R35 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V3, V4, V5 and V6 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V7, V8 and V9. Check stage V10 using audio signal generator. Apply audio signal across R3B.

If Satisfactory	If Unsatisfactory
Check audio IF and audio detector stages for component failure or change of value.	Check C50, C52, R45, T5, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustments R8 and A12. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

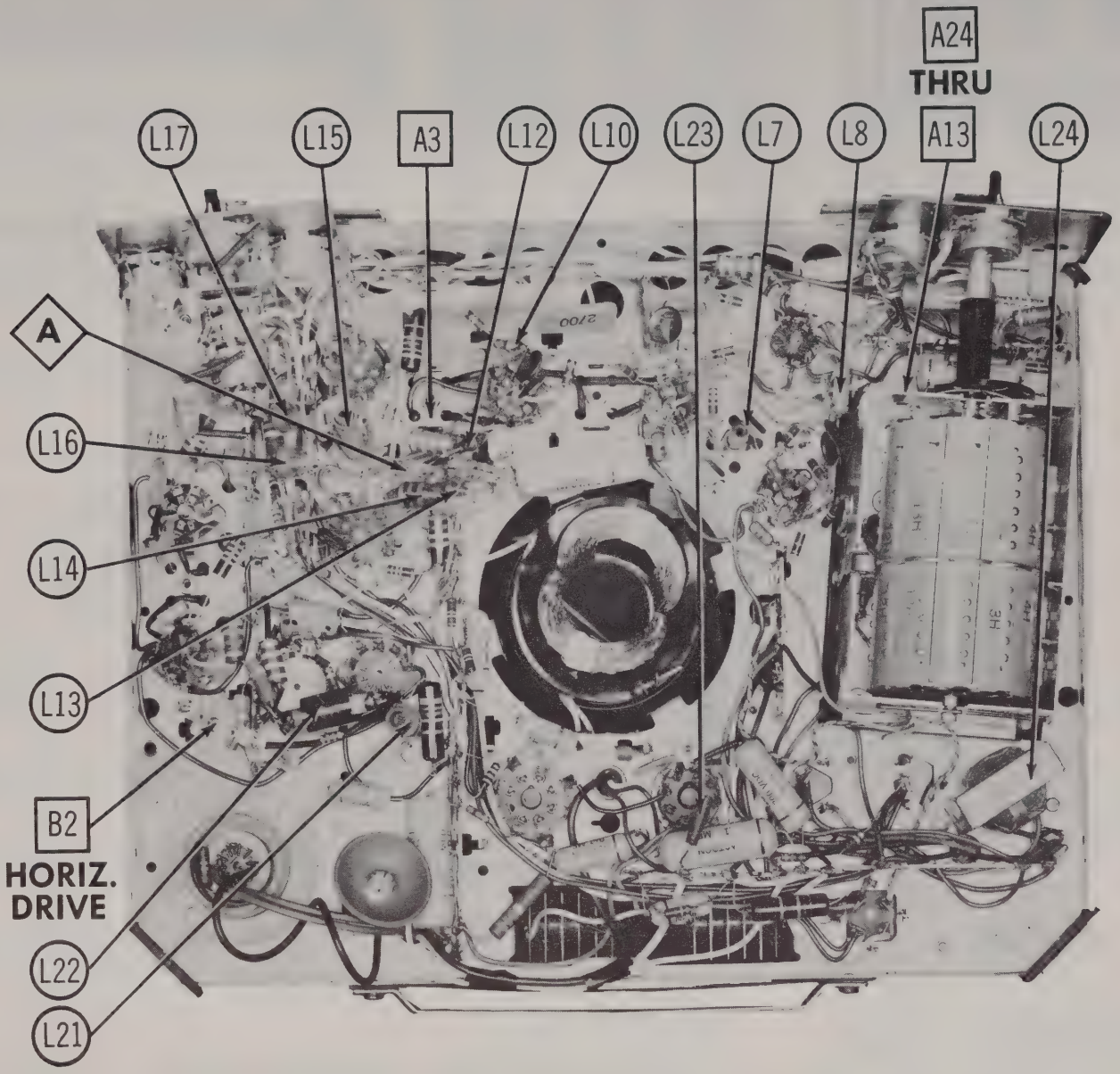
POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control T1 and R84. Tubes V9, V12 and V13 filaments are connected in series. V9, V12 and V13 will fail to light if anyone of the filaments are open. If filaments light, check M1 and M2. Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Check M1, M2, R84 and R83. Check B+ filter and decoupling network.



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

PROPERTY OF
L. F. ELANTECHNIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No	USE	REPLACEMENT DATA: CORONADO PART No	STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amp.	6BC5	6BC5	7BD	
V2	Mixer Osc.	6J6	6J6	7DF	
V3	1st Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd.Video IF & Amplifier-Video Detector	6AN8	6AN8	9DA	
V6	Video Output - Sync Sep.	6AN8	6AN8	9DA	
V7	Sound IF Amp.- Sync Amp.	6AN8	6AN8	9DA	
V8	Audio Det	6BH6	6BH6	7DF	
V9	Audio Output	25BK5	25BK5	9BQ	
V10	Vert Mult - Vert Output	12BH7	12BH7	8A	
V11	Horiz AFC - Horiz Osc.	13AU7	12AU7	8A	
V12	Horiz Output	25BQ6GT	25BQ6GT	6AM	
V13	Damper	25AX4GT	25AX4GT	4CG	
V14	HV Rectifier	1X2B	1X2B	8Y	

CATHODE-RAY TUBE

ITEM No	REPLACEMENT DATA: CORONADO PART No.	CBS HYTRON PART No	GENERAL ELECTRIC PART No	SYLVANIA PART No	WESTINGHOUSE PART No	RETMA BASE TYPE	NOTES
V15	17HP4	17HP4	17HP4	17HP4, 17RP4	17HP4	12L	① Circuit changes necessary.
	21YP4	21YP4	21YP4	21YP4	21YP4	12L	
				21YP4A		12L	
				21AFP4 ①		12M	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: CORONADO PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1	150	150	8C-22464			FP1T	TM-150-150	T-050	
C2	150	150	8C-22463			FP1T	TM-150-150	T-050	
C3A	±100	300	8C-23889			FP389.1			
B	±10	300				FP389			
C	+25 -15	450							
D	80	50							
C4	470	500	8P3-121	DS-471	GP2K-471	MC345		K-1347	
C5	470	500	8P3-121	DS-471	GP2K-471	MC346		K-1347	
C6	3-8		31A-079	839-10					
C7	800		13M102Z02	MFT-1000					
C8	3-8		31A-066-1	839-3	31S5-01-QR5	CT565A			
C9	120		13L8D12K	D6-121	GP2K-121	UC-5312			
C10	130		13L8D13K	D6-121	GP2K-121	UC-5312			
C11	1000		13L8Y102Z	DD-102	801-001	DC-521			
C12	800		13M102Z02	MFT-1000					
C13	120		13L8D12K	D6-121	GP2K-121	UC-5312			
C14	3-8		31A-066-1	839-3	31S5-01-QR5	CT565A			
C15	10		13L8C100A	TCN-10	NT60K-100	MT-541			
C16	5		13L8UA050C	TCZ-4.7	NP0K-050	ZT-555			
C17	1000		13L8Y102Z	DD-102	801-001	DC-521			
C18	10		13L8C100A	TCN-10	NP0K-100	ZT-541			
C19	120		13L8D12K	D6-121	GP2K-121	UC-5312			
C20	800		13M102Z3	MFT-1000					
C21	800		13M102Z3	MFT-1000					
C22	1000		8G-13201	D6-102	GP2L-102	UC-521		K-1210	
C23	5000		8G-13963	DD-502	811-005	DC-525		C-1250	
C24	3000		8G-19523	D6-302	GP2-333-203	UC-523		C-1230	
C25	1000		8G-13201	D6-102	GP2L-102	UC-521		K-1210	
C26	5000		8G-13963	DD-502	811-005	DC-525		C-1250	
C27	5		8G-13166	TCZ-4.7	NP0K-050	ZT-555		KR-1850	
C28	47		8G-19731	TCZ-47	NP0K-470	ZT-5447		KR-1447	
C29	1000		8G-13201	D6-102	GP2L-102	UC-521		K-1210	
C30	680		8G-21106	D6-681	GP2K-681	UC-5368		K-1268	
C31	1000		8G-13201	D6-102	GP2L-102	UC-521		K-1210	
C32	5000		8G-13963	DD-502	811-005	DC-525		C-1250	
C33	5000		8G-13963	DD-502	811-005	DC-525		C-1250	
C34	5000		8G-13963	DD-502	811-005	DC-525		C-1250	
C35	1000		8G-13201	D6-102	GP2L-102	UC-521		K-1210	
C36	5		8G-13166	TCZ-4.7	NP0K-050	ZT-555		KR-1850	
C37	5		8G-12166	TCZ-4.7	NP0K-050	ZT-555		KR-1850	
C38	.82	200	8K-23080			PT4622	IMP3-P82	S302022	
C39	.1	200	8K-23084	DF-104		PT401	IMP3-P1	S30201	
C40	51		8Q-23793	TCN-51	N750L-510				
C41	.01	400	8K-23096	DF-103		PT401	IMP4-P1	S30401	
C42	3.3		8L-23551	TCZ-3.3	NP0K-3R3	ZT-5533			
C43	33		8Q-19503	TCZ-33	NP0K-330	ZT-5433		KR-1433	
C44	10000		8G-20269	DD-103	811-01	DC-511			
C45	470	500	8P2-121			MC3245		KR-1347	
C46	10000		8G-20269	DD-103	811-01	DC-511			
C47	10000		8G-20269	DD-103	811-01	DC-511			
C48	10		8Q-21789	TCN-10	NP0K-100	ZT-541		KR-1410	
C49	1000		8G-13201	D6-102	GP2L-102	UC-521		K-1210	
C50	.01	400	8K-20289	D6-103	GP2-333-103	PT411	IMP4-S1	S30411	
C51	.01	400	8K-23091	D6-103	GP2-333-103	PT411	IMP4-S1	S30411	
C52	.0039	800		D6-402	GP3-333-402	PT624	IMP3-D4	S306239	Note 1
C53	220		8G-19665	D6-221	GP2K-221	UC-5322		K-1322	
C54	5000		8G-13963	DD-502	811-009	DC-525		C-1250	
C55	.047	200	8K-23083	DF-503		PT4147	IMP3-S47	S302147	
C56A	.002		+8TA-23276	+PC-100	+1405-01	PT625	IMP6-D2	C-1250	
B	.005					PT625	IMP6-D5	C-1250	
C	.005					PT625	IMP6-D5	C-1250	
C57	3000		8G-19523	D6-302	GP3-333-302	UC-523		C-1230	
C58	.1	200	8K-23084	DF-104		PT401	IMP3-P1	S30201	
C59	.033	400	8K-23818			PT4135	IMP6-S3	S306133	

CAPACITORS (cont)

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: CORONADO PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C60	.1	200	8K-23084	DF-104		PT401	IMP2-P1	330201	
C61	.1	400	8K-23095	DF-104		PT401	IMP4-P1	330401	
C62	1000	2000	8G-23781	DD30-102	3KV-102			C-3210	
C63	.022	400	8K-23093	DF-223	S17-03	PT4123	IMP4-S23	3304123	
C64	.022	200	8K-23092	DF-223	S17-03	PT4123	IMP3-S23	3302123	
C65	82	500	8P3-123					KR-1483	
C66	82	500	8P3-123					KR-1483	
C67	220	500	8P3-117			MCB340		KR-1323	
C68	.047	200	8K-23083	DF-503		PT4147	IMP3-S47	3302147	
C69	.022	200	8K-23082	DF-223	S17-03	PT4123	IMP3-S23	3302123	
C70	.47	200	8K-23087			PT4047	IMP2-P47	3302047	
C71	.047	400	8K-23094	DF-503		PT4167	IMP4-S67	3304147	
C72	330	500	8P3-119					KR-1333	
C73	.0068	600	8M-24087						
C74	470		8Q-23779		D6-471	S01-471	UC-5347	K-1347	
C75	.001	600	8K-23099		D6-102	GP2L-102	PT631	IMP6-D1	330631
C76	.047	400	8K-23094		DF-503		PT4147	IMP4-S47	3304147
C77A	5000		8G-23790		DD6-502	S11-005	DC-525		C-1250
B	5000					S11-006	DC-525		C-1250
C78	.1	600	8K-23095				PT601	IMP6-P1	330601
C79	.15	200	8K-23085				PT4015	IMP3-P15	3302015
C80	220	3000	8G-23953		DD30-221	3KV-221		K-3322	
C81	47	3000	8G-24096		DD30-470	3KV-470			Note 2
C82	47	2000	8G-23545		DD20-470	2KV-470	MCL-447		
C83	5000		8G-13963		DD-502	S11-005	DC-525	C-1250	
C84	30		14B-23772						

Note 1. Some versions use .01MFD in this application (part #8K-23102).
Note 2. Not used in all versions.
+ Items C58A, C58B, C58C, R58A, R58B, R58C are combined in one unit.

CONTROLS

ITEM No	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: CORONADO PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	50KΩ	½	B-10B-23694	Q11-123	A47-50K-S	AB-31	U-35	Horiz. Hold
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R1A
R2A	500KΩ	½	B-10B-23695	Q11-133	A47-500K-S	AB-59	U-39	Brightness
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R2A
R3A	100Ω	½	D30A-23714		STY-495	PT-4	UF13L †	Contrast-Picsel
B	1Meg	½			Not Req.	R2-52	UR16A †	Volume-Resr
C	Switch				Not Req.	KB-1	U8-26 †	Attach to R3B
R4A	100KΩ	½	B-10B-23693	Q11-138	A47-100K-S	AB-40	U-41	Vert. Hold
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R4A
R5A	600Ω	½	B-10B-23407	Q11-114	A47-500Ω-S	AB-10	SU-16	Vert. Linearity - Note 1
	with 1000Ω stop.							
B	Shaft		Not Req.	HQ	FKS-1/4	AK-1	Not Req.	Attach to R5A
R6A	3Meg	½	B-10B-23696	Q11-140	A47-3Meg-S	AB-84	SU-59	Vert. size
B	Shaft		Not Req.	HQ	FKS-1/4	AK-1	Not Req.	Attach to R6A
R7A	250KΩ	½	B-10B-23856	Q11-130	A47-250K-S	AB-50	SU-46	Coarse Horiz. Hold
B	Shaft		Not Req.	HQ	FKS-1/4	AK-1	Not Req.	Attach to R7A
R8	750Ω	1	A-10D-23857		38-750			Buzz Wire Wound

Note 1. Connect a 1000Ω resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
† Universal replacement (Mallory exact duplicate part no. UE-858).

RESISTORS

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: CORONADO PART No.	IRC PART No.	NOTES
R9	220KΩ	½	9BI-27	BTS-220K	
R10	220KΩ	½	9BI-27	BTS-220K	
R11	15KΩ	½		BTS-15K	
R12	47KΩ	½		BTS-47K	
R13	220Ω	½		BTS-2200	
R14	1000Ω	½		BTS-1000	
R15	4700Ω	½		BTS-4700	
R16	100KΩ	½		BTS-100K	
R17	15KΩ	½		BTS-15K	
R18	10KΩ	½		BTS-10K	
R19	15KΩ	½		BTS-15K	
R20	12KΩ	½	9BI-75	BTS-12K	
R21	82KΩ	½	9BI-82	BTS-8200	
R22	47Ω	½	9BI-46	BTS-47	
R23	1000Ω	½	9BI-62	BTS-1000	
R24	18KΩ	½	9BI-77	BTS-18K	
R25	1000Ω	½	9BI-62	BTS-1000	
R26	620 5%	½	9BI-150	BTS-62 5%	
R27	1000Ω	½	9BI-62	BTS-1000	
R28	82Ω	½	9BI-49	BTS-82	
R29	33KΩ	½	9BI-80	BTS-33K	
R30	1000Ω	½	9BI-62	BTS-1000	
R31	1Meg	½	9BI-98	BTS-1Meg	
R32	4700Ω	2		BTS-4700	
R33	1Meg	½	9BI-98	BTS-1Meg	
R34	47Ω	½	9BI-46	BTS-47	
R35	5600Ω	5	9B4-71		
R36	100KΩ	½	9BI-85	BTS-100K	
R37	22KΩ	½	9BI-78	BTS-22K	
R38	1000Ω	½	9BI-62	BTS-1000	
R39	100KΩ	½	9BI-85	BTS-100K	
R40	33KΩ	1	9B2-80	BTA-33K	
R41	18KΩ	2	9B4-77	BTS-18K	
R42	680Ω	½	9BI-60	BTS-680	
R43	220KΩ	½	9BI-90	BTS-220K	
R44	330KΩ	½	9BI-92	BTS-330K	
R45	150Ω	1	9B2-52	BTA-150	
R46	470KΩ	½	9B4-29	BTS-470K	
R47	10KΩ	½	9BI-74	BTS-10K	
R48	470KΩ	½	9BI-94	BTS-470K	
R49	2.2Meg	½	9BI-103	BTS-2.2Meg	
R50	22KΩ	2		BTB-22K	
R51	1Meg	½	9BI-98	BTS-1Meg	
R52	560KΩ	½	9BI-95	BTS-560K	
R53	100KΩ	½	9BI-85	BTS-100K	
R54	470Ω	1	9BI-86	BTA-470Ω	
R55	100Ω	½	9BI-62	BTS-1000	
R56A	22KΩ	½		BTS-22K	
B	8200Ω	½	+17A-22376	BTS-8200	
C	8200Ω	½		BTS-8200	
R57	47KΩ	2		BTB-47K	
R58	82KΩ	½	9BI-85	BTS-82K	
R59	4700Ω	1	9BI-70	BTA-4700	
R60	2.2Meg	½	9BI-103	BTS-2.2Meg	
R61	100KΩ	½	9BI-86	BTS-100K	
R62	3.3Meg	½	9BI-102	BTS-3.3Meg	Note 4
R63	330Ω	5	9C12-1105		
R64	100KΩ	½	9BI-86	BTS-100K	
R65	150KΩ	½	9BI-88	BTS-150K	
R66	82KΩ	½	9BI-85	BTS-82K	
R67	820KΩ	½	9BI-97	BTS-820K	
R68	330KΩ	½	9BI-92	BTS-330K	
R69	3900Ω	½	9BI-89	BTS-3900	
R70	100KΩ	½	9BI-86	BTS-100K	
R71	30KΩ	½		BTS-30K	Note 1
R72	150KΩ	1		BTA-150K	
R73	8200Ω	½	9BI-73	BTS-8200	
R74	47KΩ	2	9BI-82	BTB-47K	
R75	470KΩ	½	9BI-94	BTS-470K	
R76	100Ω	½	9BI-50	BTS-100	
R77	5200Ω	2	9B4-73	BTB-8200	
R78	1.5Ω	½	9C1-1065		
R79	10000Ω	10		PW10-1000	Note 2
R80	1500Ω	10		PW10-1500	Note 3
R81	2700Ω	3	9C11-1104		
R82	220KΩ	½	9BI-87	BTS-220K	

RESISTORS (cont)

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: CORONADO PART No.	IRC PART No.	NOTES
R83	9Ω	b	46M-23018		
R84	133Ω	10	9C-23172		
R85	560Ω	½	9BI-59	BTS-560	

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: CORONADO PART No.	IRC PART No.	NOTES
R86	560Ω	½	9BI-59	BTS-560	Note 2
R87	47Ω	½			

+ Items R56A, R56B, R56C, C56A, C56B and C56C are combined in one unit.
Note 1 Some models may use a 33KΩ resistor in this application.
Note 2. Not used in all versions
Note 3.Some versions may use a 3500Ω resistor in this application.
Note 4. Some versions may use a 2.2meg resistor in this application.

TRANSFORMER (FILAMENT)

ITEM No.	RATING: PRI.	SEC. 1	SEC. 2	REPLACEMENT DATA: CORONADO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No	Thordarson PART No
T1	117VAC @ .29A	13.6VCT @ 3.4A		12D23699	P-8130					

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: CORONADO PART No.	Halldorson PART No.	Merit PART No.	RCA PART No.	Ram PART No.	Stancor TYPE No.	Thordarson PART No.	Triad PART No.
T2	Horiz. Output Trans.	12E-23939							
T3	Vert. Output Trans.	12E-23725	21804	A-3037	222TI	V313	A-8123	26S52	A-103X
T4A	Yoke-Horiz. (9MH)	201-23744 ①	D7601 ② ③	MDP-7013 ② ③	206DI ② ③	Y70T09 ② ③	DY-8A ② ③	Y-5 ② ③	Y-13 ② ③
B	Vert. (42MH)								

① Includes deflection yoke part no. 13M-23755, C82, R85 and R86.
② Use original yoke cover and positioning device.
③ Use original horizontal yoke network.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	SEC.	REPLACEMENT DATA: CORONADO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T5	6.6KΩ	3.5Ω	13C-23704	A-3678①	A-3026	S-7X ①	22115 ①	22S66	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: CORONADO PART No.	VIKING PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3.5Ω	18A23735 ①	426	4A07	① Used in models TV1-9017A
	4"	PM	3.5Ω	18A24183 ②	426	4A07	② Used in models TV1-9017B and TV1-9135A, B

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	SEC	REPLACEMENT DATA: CORONADO PART No	MEISSNER PART No	MERIT PART No.	MILLER PART No.	NOTES
L1A	Ant. Coil	0Ω CT	0Ω	31M-012-3R				Channel 2
B	Ant. Coil	0Ω CT	0Ω	31M-012-3R				Channel 3
C	Ant. Coil	0Ω CT	0Ω	31M-013-4R				Channel 4
D	Ant. Coil	0Ω CT	0Ω	31M-012-5R				Channel 5
E	Ant. Coil	0Ω CT	0Ω	31M-012-6R				Channel 6
F	Ant. Coil	0Ω CT	0Ω	31M-012-7R				Channel 7
G	Ant. Coil	0Ω CT	0Ω	31M-012-8R				Channel 8
H	Ant. Coil	0Ω CT	0Ω	31M-012-9R				Channel 9
I	Ant. Coil	0Ω CT	0Ω	31M-012-10R				Channel 10
J	Ant. Coil	0Ω CT	0Ω	31M-012-11R				Channel 11
K	Ant. Coil	0Ω CT	0Ω	31M-012-13R				Channel 13
L	Ant. Coil	0Ω CT	0Ω	31M-013-13R				Channel 13
L2	Fil. Choke	0Ω		34A-546				
L3A	RF, Mixer Grid, Osc. Coil	0Ω		31M-112-2R				Channel 2
B	RF, Mixer Grid, Osc. Coil	0Ω		31M-112-3R				Channel 3
C	RF, Mixer Grid, Osc. Coil	0Ω		31M-112-4R				Channel 4
D	RF, Mixer Grid, Osc. Coil	0Ω		31M-112-5R				Channel 5
E	RF, Mixer Grid, Osc. Coil	0Ω		31M-112-6R				Channel 6
F	RF, Mixer Grid, Osc. Coil	0Ω		31M-112-7R				Channel 7
G	RF, Mixer Grid, Osc. Coil	0Ω		31M-112-8R				Channel 8
H	RF, Mixer Grid, Osc. Coil	0Ω		31M-112-9R				Channel 9
I	RF, Mixer Grid, Osc. Coil	0Ω		31M-112-10R				Channel 10
J	RF, Mixer Grid, Osc. Coil	0Ω		31M-112-11R				Channel 11
K	RF, Mixer Grid, Osc. Coil	0Ω		31M-112-12R				Channel 12

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: CORONADO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L	RF, Mixer Grid, Osc. Coil	0Ω		31M-112-13H				Channel 13
L4	Fil. Choke	0Ω		34A-575				
L5	RF Choke	0Ω		31B-638-1				
L6	1st. Video IF	.9Ω		31B-257-8				
L7	2nd. Video IF	.1Ω		201-23829	17-1004 *	TV-103 ■	6189 ■	
L8	RF Choke	1.8Ω		16A-18676				2.2 Microhenries, IRC part #CLA
L9	3rd. Video IF			201-24043				Includes 27KΩ resistor, 510Ω resistor, 47MMF and 470MMF Cap.
L10	Shunt Peaking Coil	2.3Ω		201-20265	19-3036	TV-180	6176	38 Microhenries
L11	4th. Video IF	.2Ω	.2Ω	13B-23887	17-4524			
L12	Series Peaking Coil	3.4Ω		16A-22923	19-6022		6152	25 Microhenries
L13	Series Peaking Coil	3.4Ω		16A-22923	19-6022		6152	25 Microhenries
L14	Shunt Peaking Coil	23Ω		16A-19365	19-3500	TV-188	4648	470 Microhenries
L15	4.5MC Trap	1.8Ω	2.9Ω	201-23729				Includes a 51MMF, 3.3MMF and 33MMF Caps.
L16	Series Peaking Coil	8Ω		16A-21391	19-3300		6155	305 Microhenries
L17	Series Peaking Coil	7Ω		16A-20970	19-3250	TV-185	6181	270 Microhenries
L18	Series Peaking Coil	2.6Ω		16A-24090	19-1005		4612	11 Microhenries
L19	Sound IF	.3Ω	.3Ω	201-23873				
L20	Quadrature Coil	5.4Ω		201-23727	17-3400		1469	
L21	Ringing Coil	43Ω		13M-24085	19-1575 ▲		6314	
L22	Horiz. Osc.	63Ω		13M-24086				tapped @ 13Ω
L23	RF Choke	1.4Ω		16A-21701	19-1005		4612	8 Microhenries

* Parallel with 5MMF Capacitor.
■ Parallel with 5MMF capacitor and enlarge mounting hole.
▲ Change capacitor across coil to .01MFD.

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D. C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA: CORONADO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L24	.220A	37.4Ω	.5 Hy.	16A-23889					

SELENIUM RECTIFIER

ITEM No.	RATING: CURRENT	REPLACEMENT DATA: CORONADO PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.250A	21J23840	1236A	RS300	6S300	6Q4	300	
M2	.250A	21J23840	1236A	RS300	6S300	6Q4	300	

MISCELLANEOUS

ITEM No.	PART NAME	CORONADO PART No.	NOTES
M3	Tuner	21I-23684	VHF
M4	Centering device	16M-23770	Includes yoke cover
M5	Ion trap	16M-19705	17" Picture Tube
	Ion trap	16M-19706	21" Picture Tube
B2	Trimmer Cap.	8E-18511	Horiz. Drive - (80-480MMF)
	Cabinet	200-23920	Model TV1-9017A, B
	Cabinet	200-24147-2	Model TV1-9135A, B
	Speaker Grill	23K-24145	Model TV1-9017B, TV1-9135A, B
	Speaker Grill	23K-23804-A152	Model TV1-9017A, B
	Knob	5G-23788-A93	Channel Selector
	Knob	5B-23789-A93	Fine Tuning
	Knob	5B-23787-A93	Contrast
	Knob	5B-23786-A93	On/Off Volume
	Knob	5B-23805-A93	Control (3 used)
	Disk	5M-23792-A93	Channel Indicator Disk
	Disk	5M-23794-A93	Control Indicator Disk
	Safety Glass	30M-18773	17" Picture Tube
	Safety Glass	30M-23709	21" Picture Tube

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V11, V12, V13 and V14. Check waveform W11.

If Satisfactory	If Unsatisfactory
Check T2, T4A, C80, C79, C81, C78, C76, R77 and other associated components.	Check L21, L22, C73, C72, R71, R73, R74 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V12, V13 and V14. Check M1 and M2. Check C75, C74, R77 and other associated components.

BLOOMING

Check by substitution V12, V13 and V14. Check M1 and M2. Check R78, C78, C80, C75 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5 and V6. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

KEYSTONE EFFECT

Check T4 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge, and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENT

Touch-up adjustment of the VHF tuner oscillator circuit may be accomplished by removal of Channel Selector and fine tuning knobs. Remove 2 screws from escutcheon ring, remove ring . The adjustments are accessible one at a time through the small hole in the cabinet to the right of the channel selector shaft. Also, the vertical size and vertical linearity adjustments are accessible when the escutcheon ring is removed.

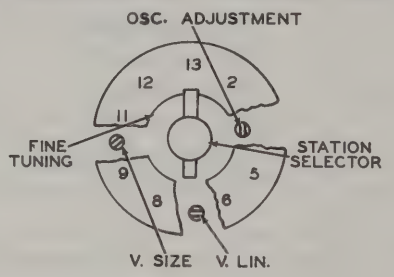
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove chassis. Remove 4 bolts from supporting brackets. Remove safety glass and frame.

PICTURE TUBE REMOVAL

For picture tube removal, remove chassis, safety glass and frame, tube socket, ion trap, H. V. lead. Remove picture tube.

SERVICE ADJUSTMENT LOCATION (ALSO SEE TUBE PLACEMENT CHART ON PAGE 5)



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the Horiz. Oscillator, it is necessary to remove the rear cover and supply power to set. Adjustment is located on rear of chassis.Set the Horiz. Hold Control at the center of its range and adjust the coarse Horiz. Hold Control until picture synchronizes horizontally. (For location see tube placement chart.)

SOUND IF DETECTOR BUZZ ADJUSTMENT

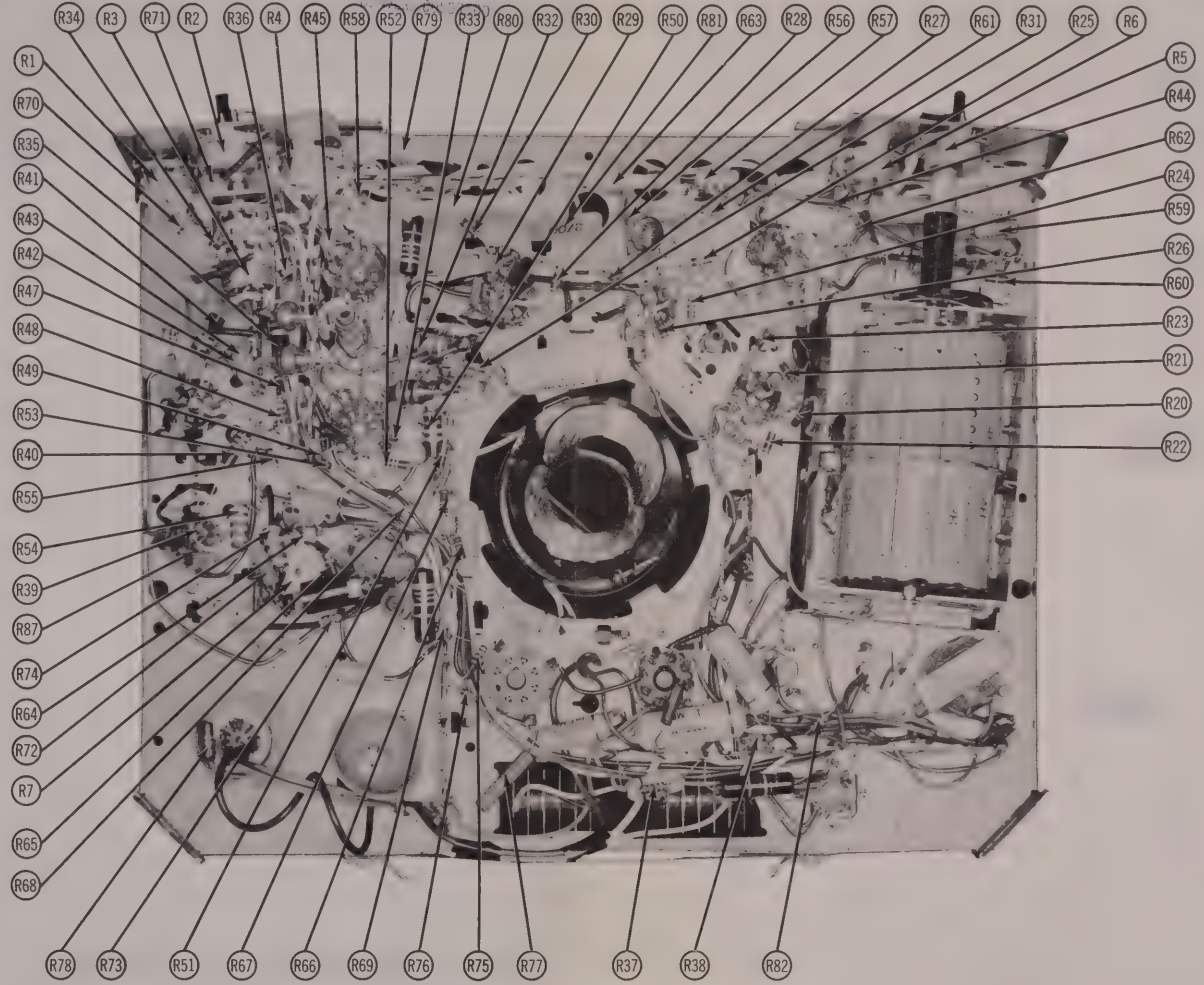
To eliminate sound IF detector buzz, adjust the buzz control located on rear of the chassis for maximum volume and minimum buzz. If results are unsatisfactory, see align instructions on pages 6 and 7.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

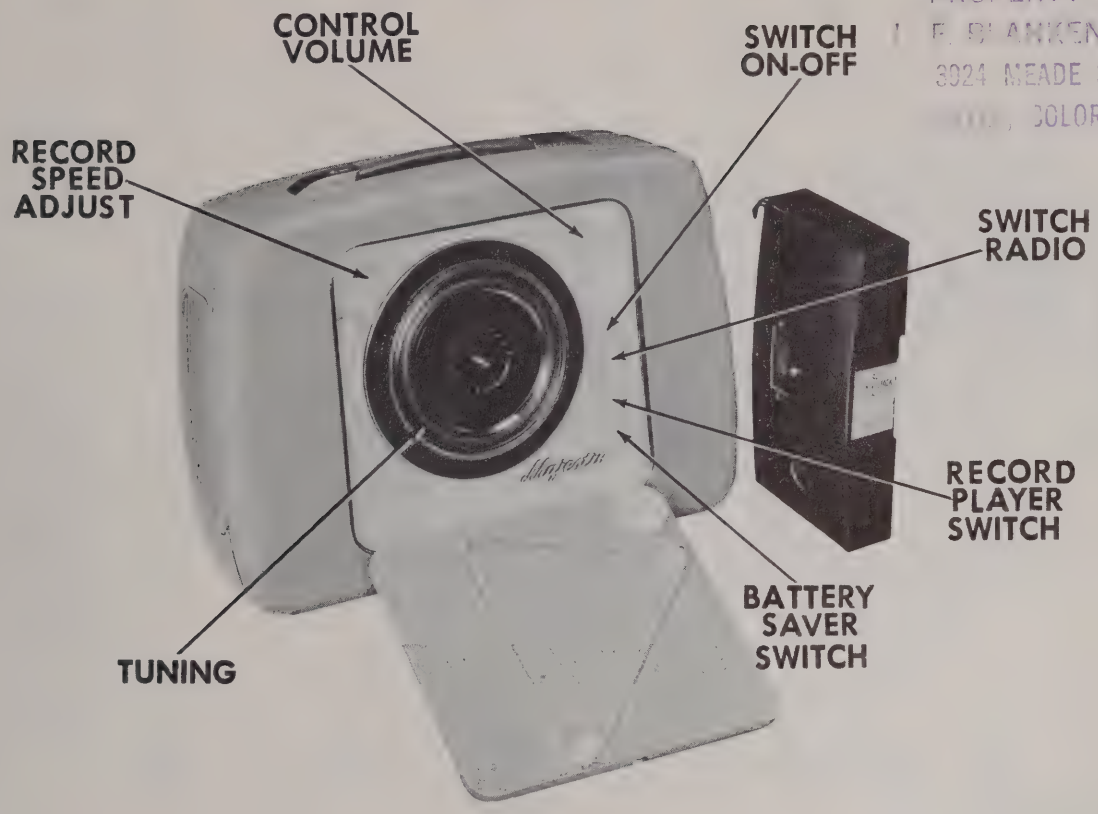
DISASSEMBLY INSTRUCTIONS

1. Remove 7 push-on type control knobs from top of cabinet.
2. Remove 5 metal screws from under side of cabinet.
3. Remove 4 metal screws. Remove rear cover.
4. Disconnect speaker leads
5. Remove 5 metal screws located on the sides and top of safety glass frame.
   Remove 2 metal screws located under top control knobs.
6. Slide picture tube and chassis from front of cabinet.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
[illegible] BLANKENSHIP
3024 MEADE ST.
[illegible], COLORADO



MAJESTIC
MODEL 4P1

TRADE NAME	Majestic Model 4P1
MANUFACTURER	Majestic Radio & Tel. Div. of Wilcox-Gay Corp., 70 Washington St., Brooklyn, 1, N.Y.
TYPE SET	Three Power Portable Radio-Phono Combination AM Superheterodyne Receiver With 45RPM Manual Record Player
TUBES (Four)	Types 1AB6 Conv., 1AJ4 IF Amp., 1AH5 Det.-AVC-AF Amp., 3V4 Output
POWER SUPPLY RATINGS	110-120 Volts AC-DC (or) 1.5 Volts "A" Supply, 90 Volts "B" Supply & 6 Volts DC "Phono Motor" Supply .06 Amp. @ 117 Volts AC (or) 170MA @ 1.5 Volts DC, 12.5MA @ 90 Volts DC & 30MA @ 6 Volts DC – Phono Motor
TUNING RANGE—BROADCAST	510KC-1630KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Use battery power, if possible. If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 6 (grid) of 1AB6 (V1). Low side to chassis.	452KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	Direct	Loop	580KC	Tune to 580KC signal	"	A5, A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.	"	"	1480KC	Tune to 1480KC signal	"	A7, A8	"

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: MAJESTIC PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	1AB6	1AB6	7DH	
V2	IF Amplifier	1AJ4	1AJ4	6AR	
V3	Det.-AVC-AF Amp	1AH5	1AH5	6AU	
V4	Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MAJESTIC PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	50	385					TDC-D50-150		
B	50	350							
C2	1000	6/8					TM-1000-15	S-005	
C3	1000	6/8					TM-1000-15	MTH-06100	
C4	5	100/110				TC40	TD-8-150	MMT-1505	
C5	100	12/15				TC2501	TD-100-15	MTH-1510	
C6	.05	125		DF-503		PT415	IMP2-S5	330215	
C7	100			D6-101	GP1K-101	UC-531		K-1310	
C8	.01	125		D6-103	GP2-333-103	PT411	IMP4-S1	330211	
C9	.05	125		DF-503		PT415	IMP2-S5	330215	
C10	.05	125		DF-503		PT415	IMP2-S5	330215	
C11	.01	125		D6-103	GP2-333-103	PT411	IMP4-S1	330211	
C12	.025	250				PT4122		3304122	
C13	100			D6-101	GP1K-101	UC-531		K-1310	
C14	.01	125		D6-103	GP2-333-103	PT411	IMP4-S1	330211	
C15	100			D6-101	GP1K-101	UC-531		K-1310	
C16	300			D6-301	GP2K-301	UC-533		K-1330	
C17	.05	125		DF-503		PT415	IMP2-S5	330215	
C18	.05	125		DF-503		PT415	IMP2-S5	330215	
C19	.05	125		DF-503		PT415	IMP2-S5	330215	
C20	1000			D6-102	GP2L-102	UC-521		K-1210	

CONTROLS

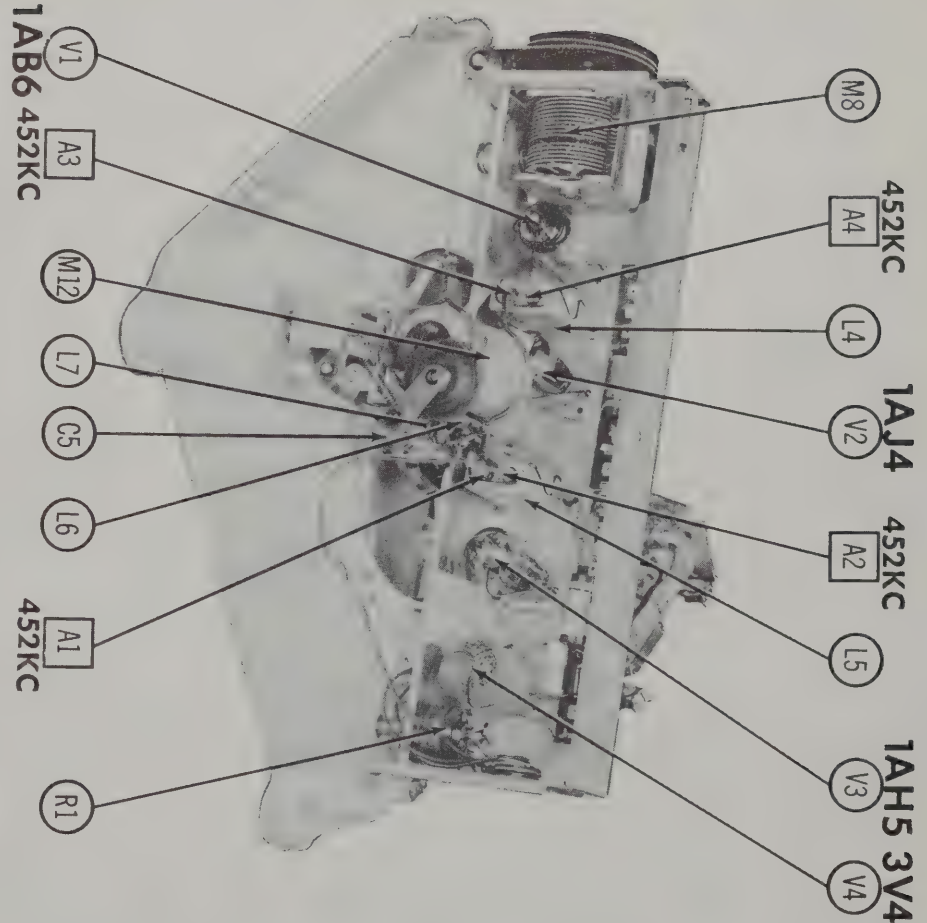
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MAJESTIC PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	2Meg	½						Volume
R2	1Meg	½						Phono Level
R3	100Ω	½						Motor Speed Adjustment

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MAJESTIC PART No.	IRC PART No.	NOTES
R4	30KΩ	½		BTS-30K	
R5	30KΩ	½		BTS-30K	
R6	120KΩ	½		BTS-120K	
R7	40KΩ	½		BTS-39K	
R8	2000Ω	½		BTS-1800	
R9	100KΩ	½		BTS-100K	
R10	2Meg	½		BTS-2.2Meg	
R11	10Meg	½		BTS-10Meg	
R12	3Meg	½		BTS-3.3Meg	
R13	200KΩ	½		BTS-180K	
R14	800KΩ	½		BTS-820K	
R15	200KΩ	½		BTS-18K	
R16	2Meg	½		BTS-2.2Meg	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MAJESTIC PART No.	IRC PART No.	NOTES
R17	10KΩ	½		BTS-10K	
R18	25Ω	½		BTS-24	
R19	25Ω	½		BTS-24	
R20	25Ω	½		BTS-24	
R21	170Ω	½		BTS-180	
R22	150Ω	½		BTS-150	
R23	100Ω	½		BTS-100	
R24	350Ω	½		BTS-360	
R25	5000Ω	½		BTS-4700	
R26	500Ω	½		BTS-470	
R27	2500Ω	½		BTS-2200	
R28	9000Ω	1		BTA-9100	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	MAJESTIC PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @.06A	125VAC .025ADC	11.7VCT .190ADC							

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MAJESTIC PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	9.8KΩ	4.2Ω							

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MAJESTIC PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4 x 7"	PM	4.2Ω				

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MAJESTIC PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	.8Ω						
L2	Ant. Coil	.8Ω						
L3	Osc. Coil	2.8Ω	6Ω		14-1074 *		71-OSC	
L4	Input IF	18Ω	18Ω		16-6758 ■	BC-352 ■	12-C1 ■	
L5	Output IF	18Ω	18Ω		16-6758 ■	BC-353 ■	12-C2 ■	
L6	Line Choke	0Ω						
L7	Line Choke	0Ω						

* Leads have sufficient mounting support.
■ Enlarge chassis hole.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	MAJESTIC PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L8	.190ADC	23.4Ω	.36 Hy						

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	MAJESTIC PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.190ADC		1306	A1B				
M2	.025ADC			Q1B				

BATTERIES

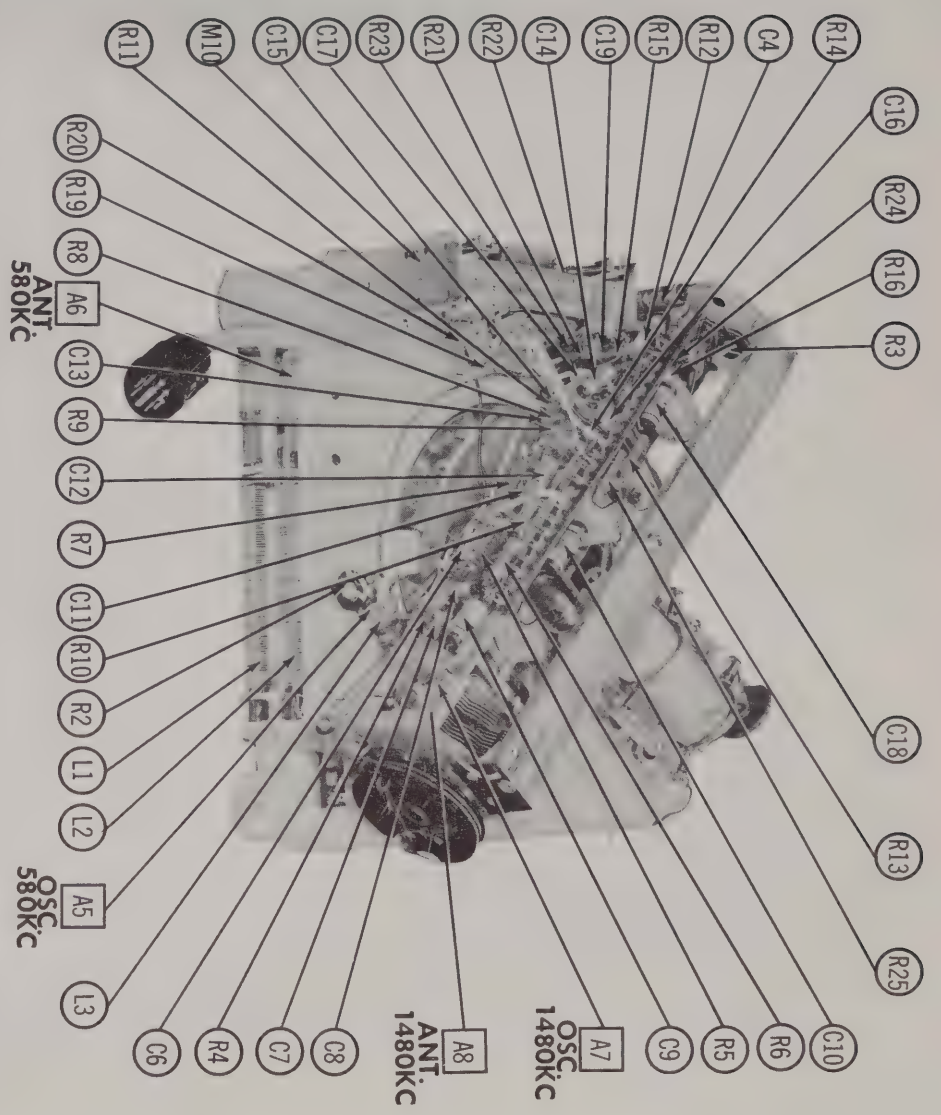
ITEM No.	VOLTAGE	MAJESTIC PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M3	1.5V "A"		950			2R			Connect 2 in parallel
M4	90V "B"			490			N60		
M5	6V *		635			#1			Connect 4 in series

* Phono Motor Supply.

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	MAJESTIC PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M6						

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

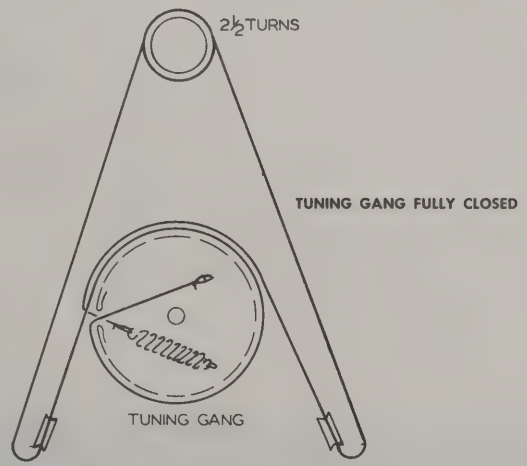
PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	MAJESTIC PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M7		†CR-55LP or ♦ CR-55LPD	†A-448 or ♦A-448D	†W-64MGS or ♦W-64MGD	† Jewel ♦ Diamond

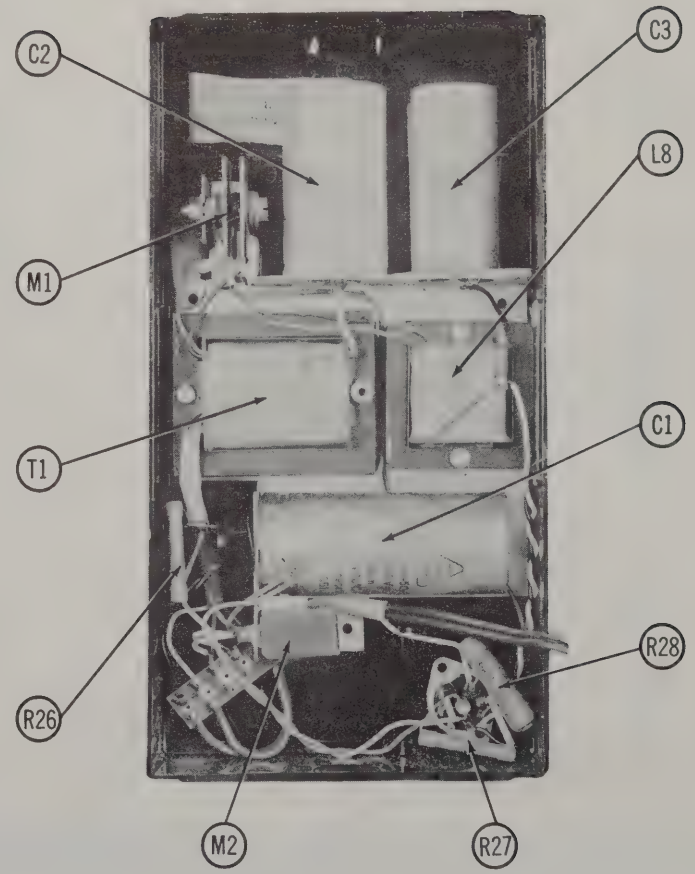
MISCELLANEOUS

ITEM No.	PART NAME	MAJESTIC PART No.	NOTES
M8	Tuning Cap.		2 Gang (22-330MMF, 25-125MMF)
M9	Switch		On-off (Power - AC Supply)
M10	Switch Assy.		Consists of 4 pushbutton switches - "S" (Current economizing adjustment), "P" (Record Player), "R" (Radio) & "O" (On-off for radio and record player).
M11	Switch		Phono motor battery saver switch
M12	Phono Motor		



DIAL CORD STRINGING

AC-DC PACK



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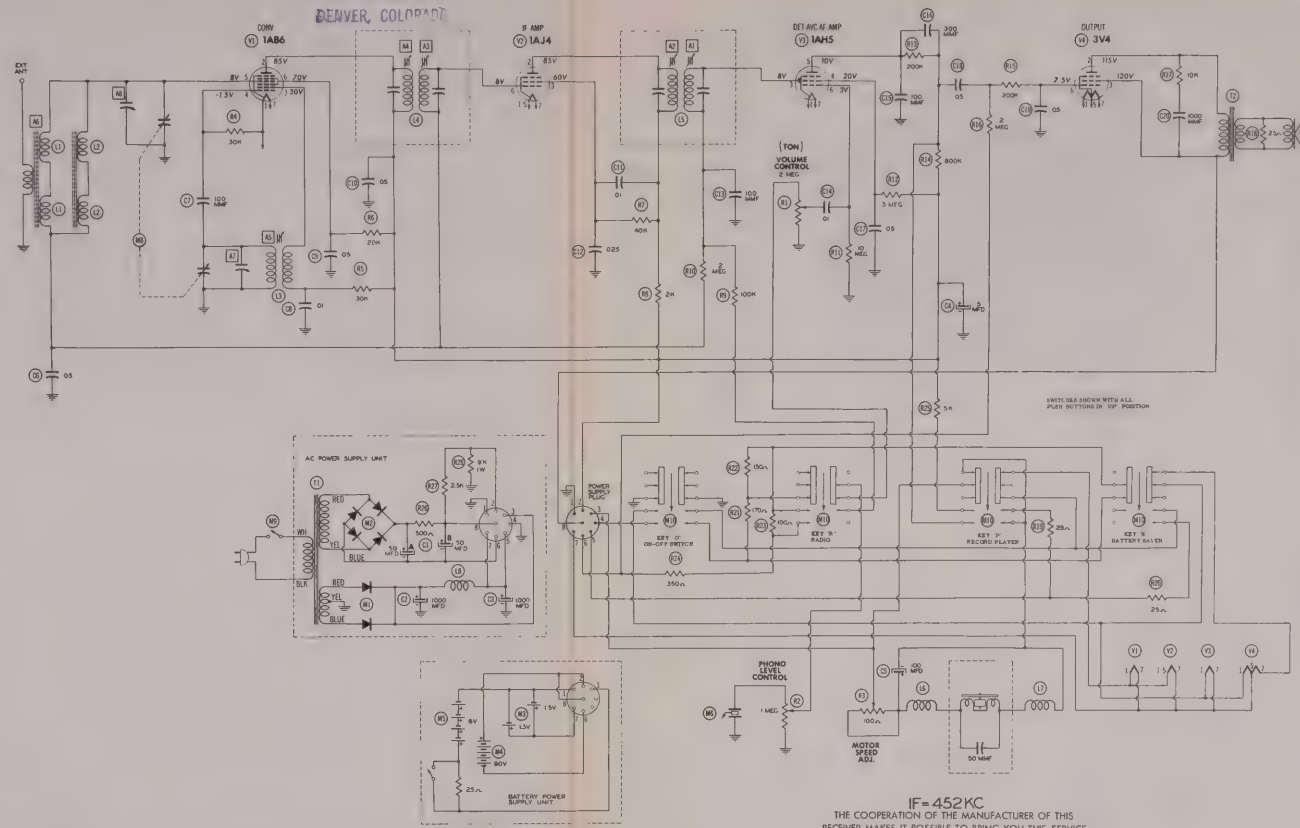
CONV V1 1AB6
1F AMP V2 1AJ4
DET AVC AF AMP V3 1AH5
OUTPUT V4 3V4
EXT ANT
(TON) VOLUME CONTROL 2 MEG
SWITCHES SHOWN WITH ALL PUSH BUTTONS IN "UP" POSITION
AC POWER SUPPLY UNIT
POWER SUPPLY PLUG
KEY 'O' ON-OFF SWITCH
KEY 'R' RADIO
KEY 'P' RECORD PLAYER
KEY 'B' BATTERY SAVER
PHONO LEVEL CONTROL
MOTOR SPEED ADJ.
BATTERY POWER SUPPLY UNIT

IF = 452 KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1AB6	*	†2.7KΩ	†30KΩ	30KΩ	†120KΩ	4Meg	*
V 2	1AJ4	*	†4.8KΩ	†40KΩ	NC	*	4Meg	*
V 3	1AH5	*	NC	2Meg	†3Meg	†1Meg	10Meg	*
V 4	3V4	*	†1.3KΩ	†500Ω	NC	*	2.5Meg	*

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE
† MEASURED FROM HIGH SIDE OF C1A
NC - NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter
2. Socket connections are shown as bottom views
3. Base voltages measured with respect to common negative
4. Line voltage maintained at 117 volts for voltage readings
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings
6. Volume control at maximum, no signal applied for voltage measurements

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PHOTOFACT* Folder

*TRADE MARK

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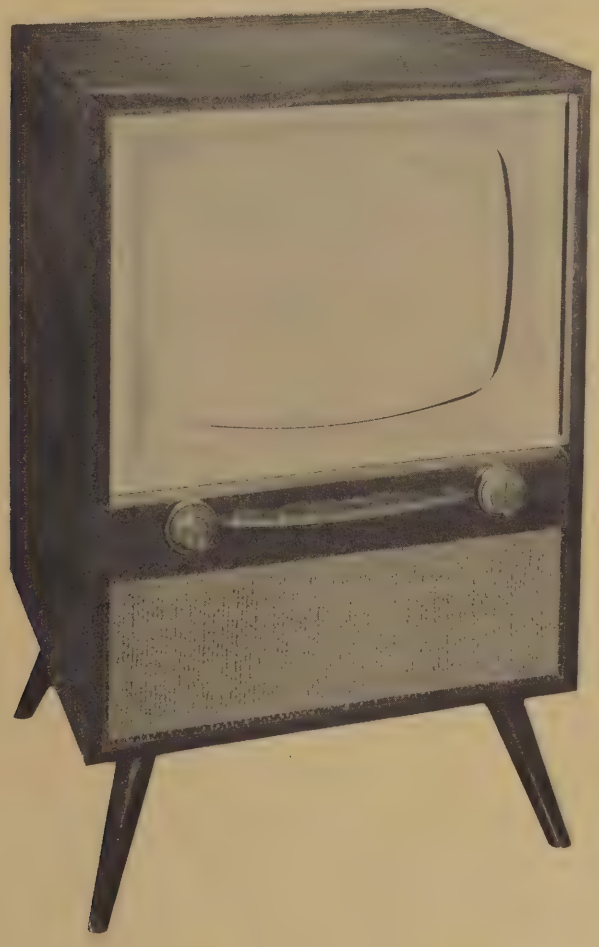

MODEL 22C4119

PHILCO MODELS 22C4119, 22C4120, L, 22C4123, 22C4124, L, 22C4310, L (Ch. 300, 301)

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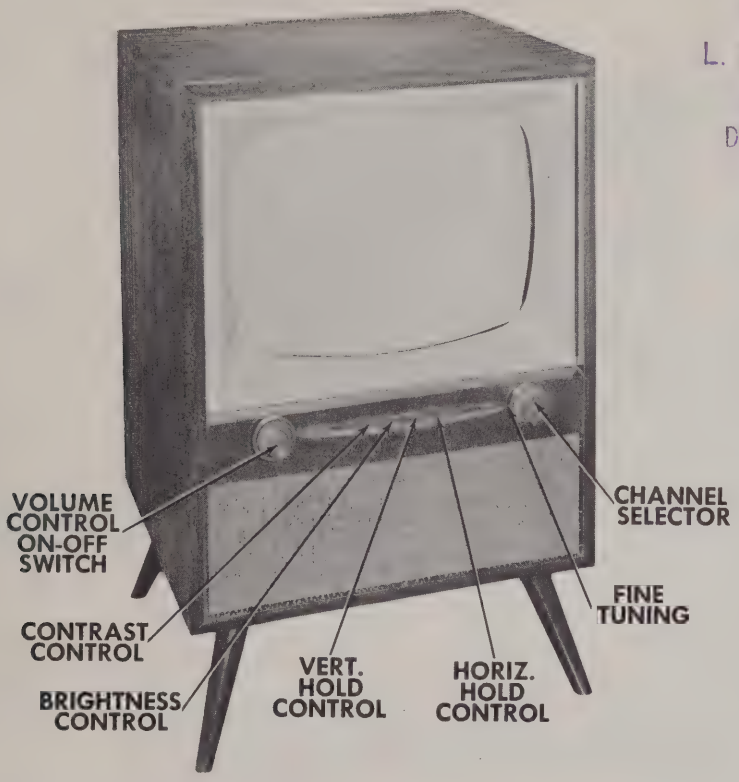

PHILCO MODEL 22C4119

TRADE NAME	PHILCO	MODELS	CHASSIS
		22C4011, 22C4013, 22C4013L, 22C4013X, 22C4015, 22C4118, 22C4119, 22C4119X, 22C4120, 22C4120L, 22C4120X, 22C4121, 22C4121L, 22C4123, 22C4124, 22C4124L, 22C4124S, 22C4127, 22C4310, 22C4310L	300, 301

MANUFACTURER	Philco Corp., Tioga & "C" Streets, Philadelphia, Pa.
TYPE SET	Television Receiver
TUBES	Seventeen
POWER SUPPLY	110-120 Volts AC - 60 Cycles RATING 1.32 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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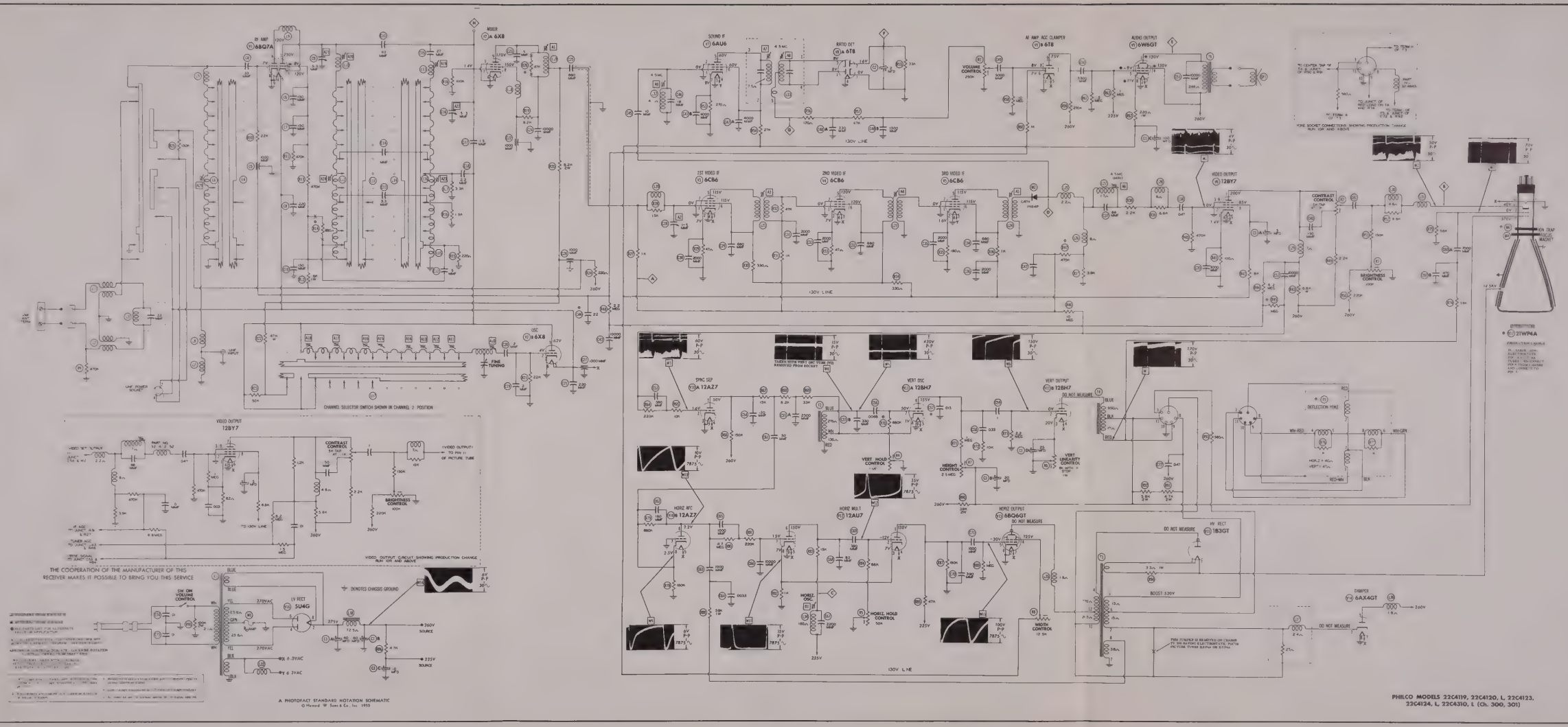
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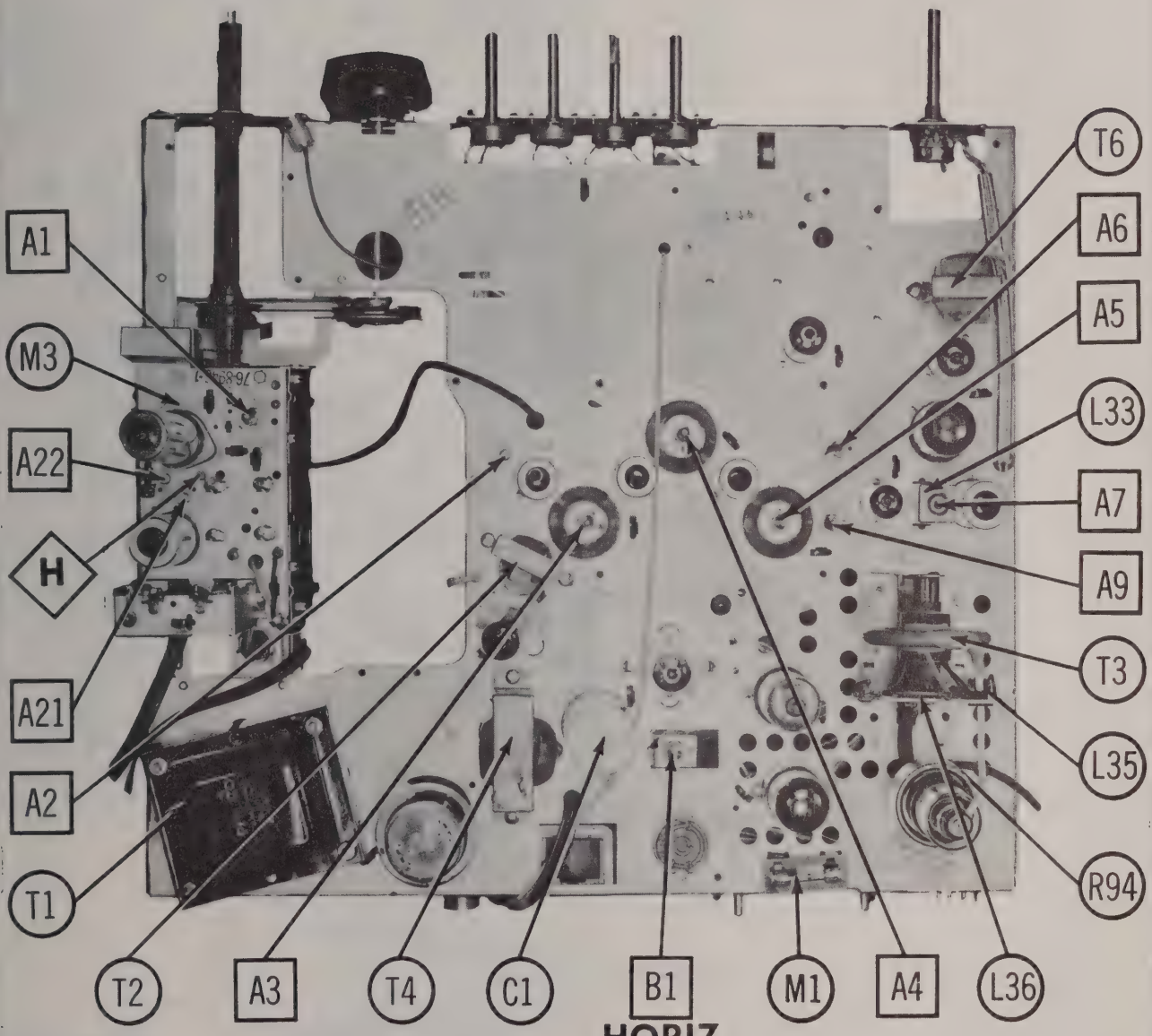

CHASSIS TOP VIEW

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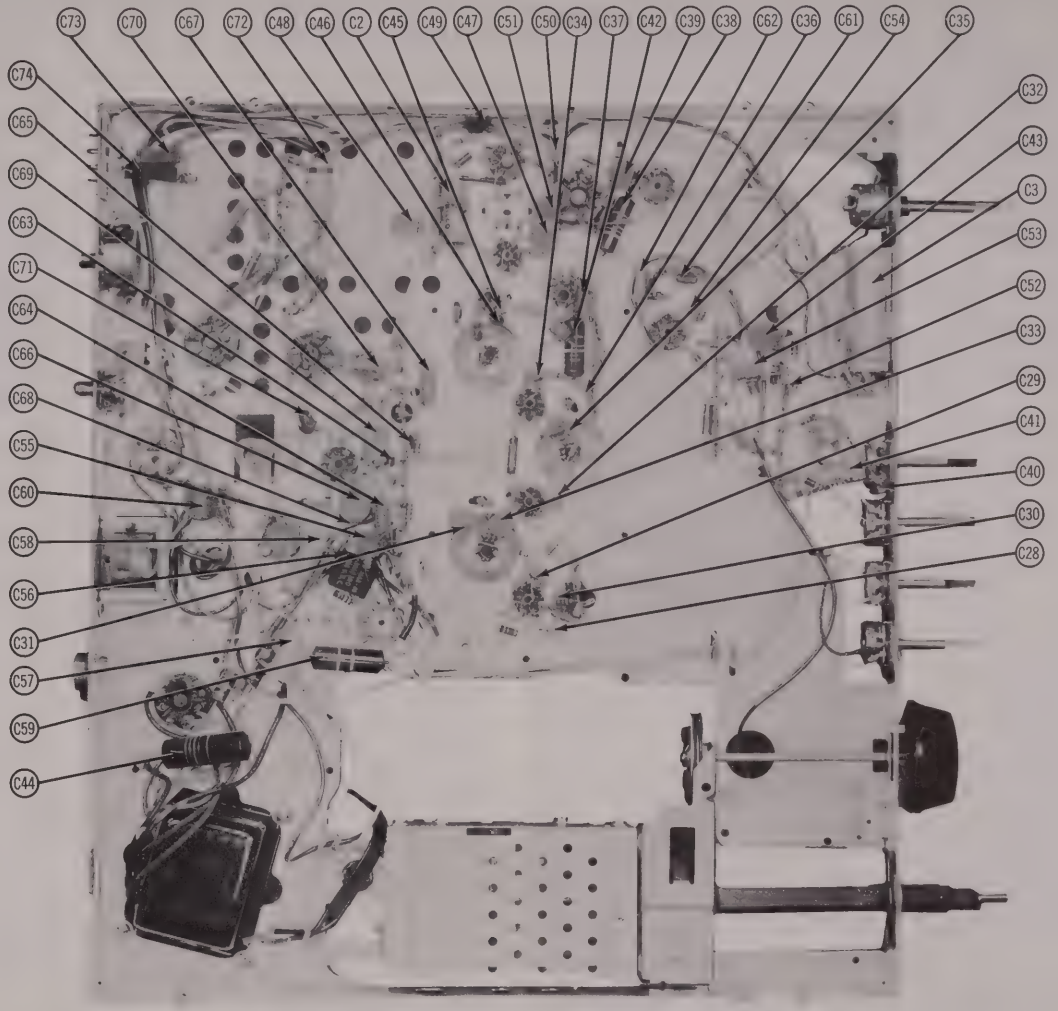

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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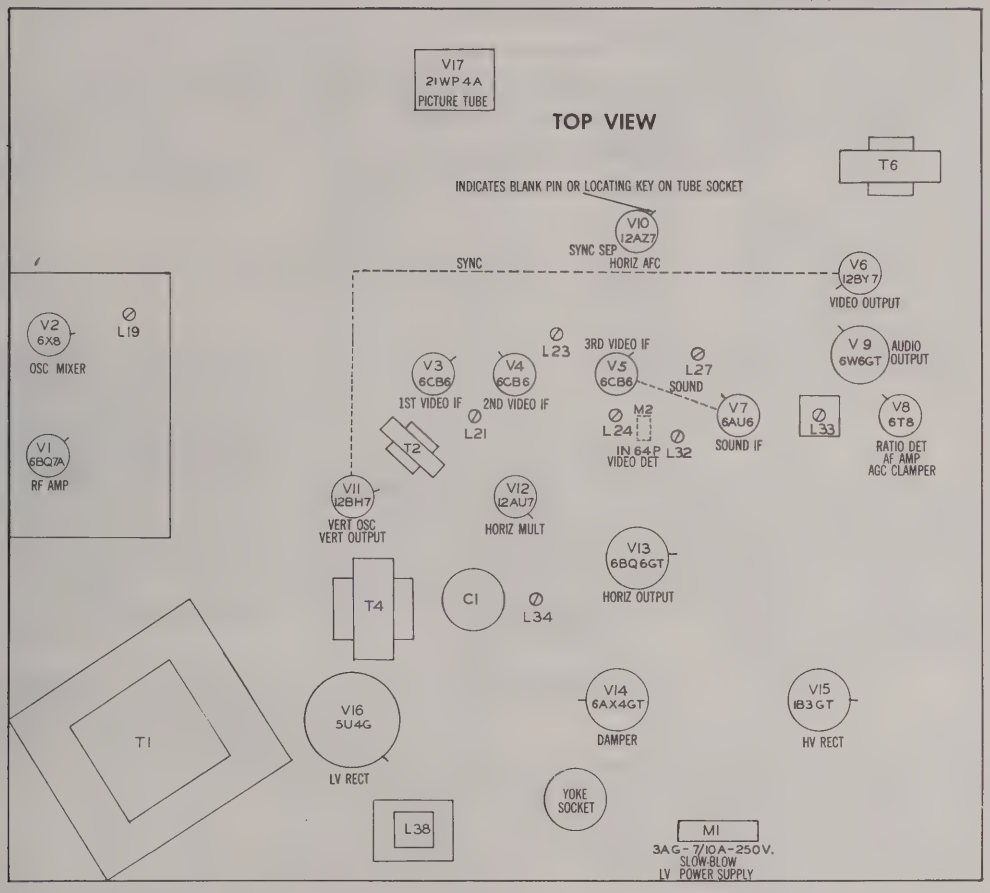
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V16, Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V9
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V17
Has pic, no sound - V7, V8, V9

SYNC FAILURE
No vert. sync - V10, V11
No horiz. sync - V10, V12
No vert. or horiz. sync - V10

SWEEP FAILURE
No raster, has sound - V12, V13, V14, V15, V17
No vertical deflection - V11
Poor vert. linearity or foldover - V11
Poor horiz. linearity or foldover - V12, V13, V14
Narrow picture - V12, V13, V14, V15, V16
Vert. off freq. - V10, V11
Horiz. off freq. - V10, V12

PHILCO MODELS 22C4119, 22C4120, L, 22C4123, 22C4124, L, 22C4310, L (Ch. 300, 301)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Allow 15 minutes for receiver and test equipment to warm up. There must be a good bond between the chassis and test equipment.
Connect the deflection yoke and speaker during alignment.
Do not remove the horizontal oscillator tube (V12) to disable the high voltage. The high voltage lead should be securely taped and kept away from chassis.

VIDEO IF ALIGNMENT

Set the contrast and brightness control fully counter clockwise.
Connect the negative lead of a 5 volt battery to point Ⓐ. Positive lead to chassis. The IF tube shield must be in place during alignment.
Set the channel selector switch to UHF position.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1	Direct	Marker to point Ⓒ. Low side to chassis.	Not used.	45.5MC (400∿ Mod. at 30%)	1	Vert. amp. to point Ⓑ. Low side to chassis.	A1	Adjust scope for 40 volts peak to peak. Adjust A1 for maximum amplitude.
2	"	"	"	43.1MC	"	"	A2	"
3	"	"	"	42.7MC	"	"	A3	"
4	"	"	"	45.0MC	"	"	A4	"
5	"	"	"	44.4MC	"	"	A5	"
6	Fig. 1	Across antenna input thru matching network. (Fig. 1)	69MC" (6MC Swp)	70.25MC 67.25MC 42.5MC	4	"		Check response curve (Fig. 2) for curve limits. Readjust A1, A2, A3, A4 and A5 for proper limits of response curve in Fig. 2. Adjust A1 and A4 for carrier level. Adjust A5 for correct curve level. Adjust A2 and A3 for 70.25MC slope. Only adjust above SLIGHTLY. If they require more than slight turning, repeat steps 1 thru 5.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Remove the first video IF tube (V3) from its socket.
Set the volume control fully clockwise.
Leave bias connected as in "Video IF Alignment".

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7	2200Ω carbon resistor	High side to point Ⓓ thru 2200Ω. Low side to chassis.	4.5MC (400∿ Mod. at 30%)	Any	DC probe to point Ⓑ. Common to chassis.	A6	Adjust for MINIMUM deflection.
8	"	"	4.5MC	Any	DC probe to point Ⓔ. Common to chassis.	A7, A8, A9	Attenuate signal generator to prevent overloading. Adjust for maximum deflection. Replace V3. Disconnect the test equipment and tune in a good TV station. Note if audio buzz is present. If necessary, readjust A8 for minimum buzz and clearest sound.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Remove V3 from its socket. Connect bias as under "Video IF Alignment".
Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7	2200Ω carbon resistor	High side to point Ⓓ. Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. amp. to point Ⓕ. Low side to chassis.	A7 A9	Disconnect stabilizing capacitor (C2). Increase generator output for reading on scope. Adjust for curve of maximum amplitude and symmetry similar to Fig. 3.
8	"	"	"	"	"	Vert. amp. to point Ⓖ. Low side to chassis.	A8	Reconnect stabilizing capacitor (C2). Adjust so that 4.5MC occurs at crossover lines as shown in Fig. 4. SLIGHTLY readjust A7 for maximum amplitude and straightness of crossover lines. Replace V3 in its socket.

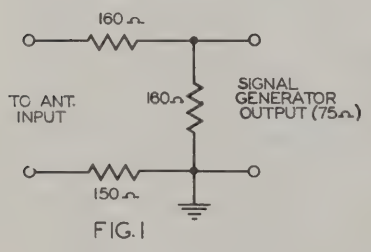


FIG. 1

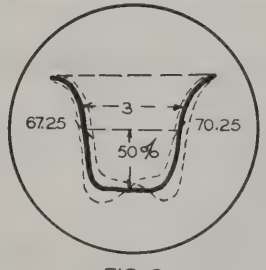


FIG. 2

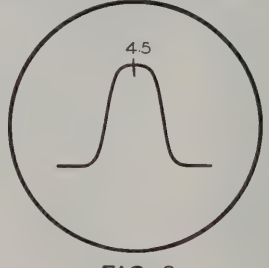
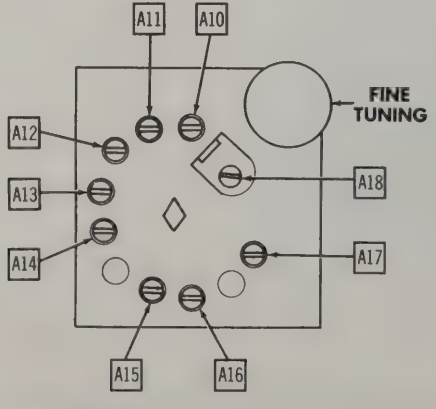


FIG. 3



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ALIGNMENT INSTRUCTIONS (cont)

ALTERNATE 4.5MC TRAP ALIGNMENT

Tune in a TV station and turn the fine tuning control clockwise until a 4.5MC beat pattern appears in picture. Adjust A8 for minimum 4.5MC beat in picture.

OSCILLATOR ALIGNMENT

Disconnect the white lead going to tuner AGC from main chassis. Connect the negative lead of a 1.5 volt battery to loose end. Positive lead to chassis.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	Not used	257MC 251MC 245MC 239MC	13 12 11 10	Vert. amp. thru 1KΩ to point (H). Low side to chassis near point (I).	A10 A11 A12 A13	Adjust for zero beat on scope. If regeneration occurs, increase bias as high as 4.5 volts if necessary.
10	"	"	"	233MC 227MC	9 8	"	A14	Adjust A14 for channel 9 frequency. Then recheck A14 for channel 8 frequency. Recheck channel 9 frequency. If necessary, make a compromise adjustment.
11	"	"	"	221MC	7	"	A15	Adjust A15 for zero beat on scope. Recheck steps 9, 10 and 11. If necessary, readjust until channels are within 500KC of their proper frequencies.
12	"	"	"	129MC	6	"	A16	Adjust for zero beat on scope.
13	"	"	"	113MC	4	"	A17	"
14	"	"	"	101MC	2	"	A18	"

RF AND MIXER ALIGNMENT

Connect the bias supply as under "Oscillator Alignment".
Disconnect tuner coupling link at the IF terminal strip near V3 and solder a 68Ω resistor to the open end of the lead from the tuner. Remove V3 from its socket. Adjust scope controls so that the width is double the height.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
15	Fig. 1	Across antenna terminals with (Fig. 1) antenna matching unit.	213MC (10MC Swp)	213MC	13	Vert. amp. to point (A). Low side to chassis near point (I).	A19, A20	Check for response curve similar to Fig. 5. If response is not flat between limits shown, detune A19 counter clockwise until single peak appears. Adjust A20 until peak falls on 213MC marker. Adjust A19 for response similar to Fig. 5.
16	"	"	177MC (10MC Swp)	177MC	7	"	A21, A22	Check for response indicated by dotted lines as in Fig. 6A and 6B. Adjust A21 and A22 for mirror image of original response curve. (Tilt in opposite direction.) If response curve appears as in Fig. 6A, adjust A21 and A22 until curve appears as in Fig. 6B. This adjustment over compensates to allow for channel 13 adjustment in next step. Repeat steps 15 and 16 until centered and symmetrical response curves are obtained on channels 7 and 13.
17	"	"	85MC (10MC Swp)	85MC	6	"	A23, A24, A25	Adjust for symmetrical response approximately at center of bandpass. Adjust A23 counter clockwise until single peak appears. Adjust A24 until peak falls on 85MC marker. Adjust A25 for maximum curve amplitude and symmetry of single peak. Retouch SLIGHTLY, if necessary, A23 and A24 for symmetrical response centered at approximately the 85MC marker point.

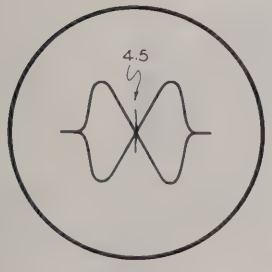


FIG. 4

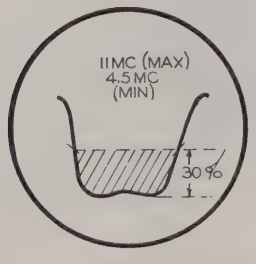


FIG. 5

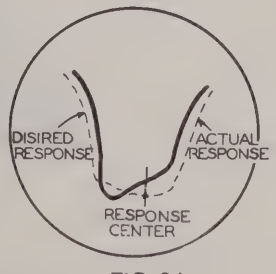


FIG. 6A

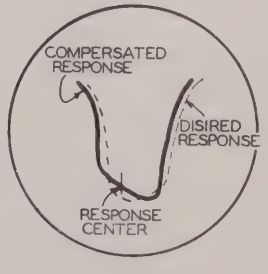


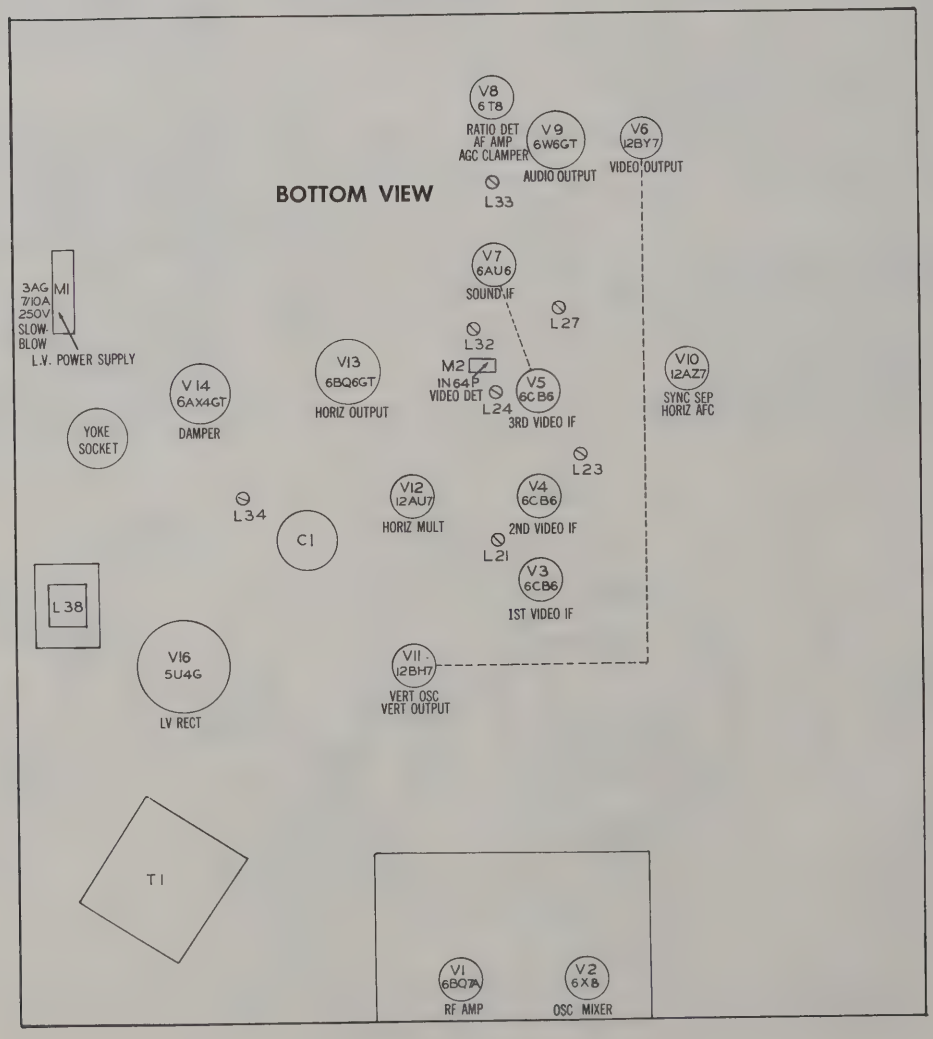
FIG. 6B

PHILCO MODELS 22C4119, 22C4120, L, 22C4123, 22C4124, L, 22C4310, L (Ch. 300, 301)

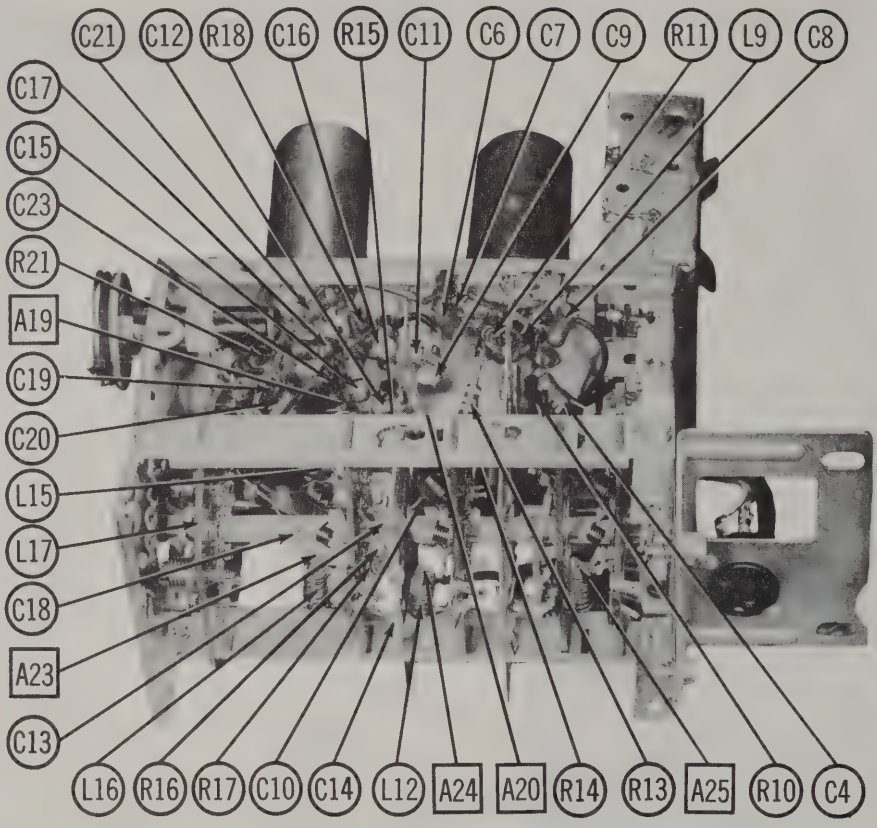
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	†2.1KΩ	†250KΩ	INF	0Ω	.1Ω	INF	8Meg	0Ω	0Ω
V 2	6X8	0Ω	22KΩ	†50KΩ	0Ω	.1Ω	0Ω	100KΩ	†17KΩ	†8.5KΩ
V 3	6CB6	500KΩ	47Ω	.1Ω	0Ω	▲700Ω	▲700Ω	0Ω		
V 4	6CB6	500KΩ	47Ω	.1Ω	0Ω	▲350Ω	▲350Ω	0Ω		
V 5	6CB6	.1Ω	180Ω	.1Ω	0Ω	▲1KΩ	▲1KΩ	0Ω		
V 6	12BY7	100Ω	470KΩ	0Ω	0Ω	0Ω	.1Ω	†5KΩ	▲18KΩ	0Ω
V 7	6AU6	4.1Ω	0Ω	0Ω	.1Ω	▲27KΩ	▲27KΩ	270Ω		
V 8	6T8	300KΩ	33KΩ	300KΩ	0Ω	.1Ω	8Meg	0Ω	10Meg	†270KΩ
V 9	6W6GT	220KΩ	0Ω	†325Ω	†75Ω	650KΩ	60KΩ	.1Ω	220KΩ	
V 10	12AZ7	†80KΩ	5Meg	0Ω	.1Ω	.1Ω	960KΩ	0Ω	180KΩ	0Ω
V 11	12BH7	▲12KΩ	2.2Meg	1.7KΩ	.1Ω	.1Ω	▲1.8Meg	1.3Meg	135Ω	0Ω
V 12	12AU7	†45KΩ	1Meg	1KΩ	.1Ω	.1Ω	†20KΩ	6Meg	1KΩ	0Ω
V 13	6BQ6GT	56KΩ	0Ω	†45KΩ	▲800Ω	1Meg	INF	.1Ω	0Ω	TOP CAP ▲23Ω
V 14	6AX4GT	INF	INF	100KΩ	†40KΩ	†75Ω	INF	.1Ω	0Ω	
V 15	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲795Ω
V 16	5U4G	INF	60KΩ	INF	25Ω	100KΩ	24Ω	INF	60KΩ	
V 17	21WP4A	0Ω	56KΩ	PIN 10 ▲10KΩ	PIN 11 †250KΩ	PIN 12 .1Ω				

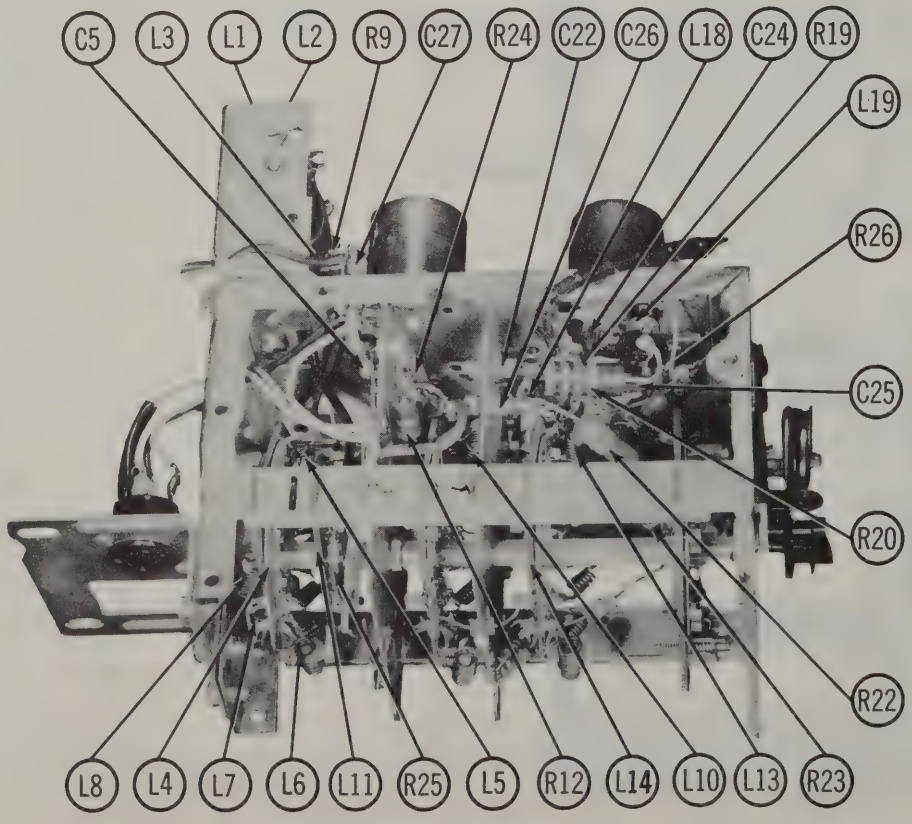
† MEASURED FROM PIN 2 OF V16
▲ MEASURED FROM 130V LINE
▲ MEASURED FROM PIN 3 OF V14
♦ MEASURED FROM 225V LINE



TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE

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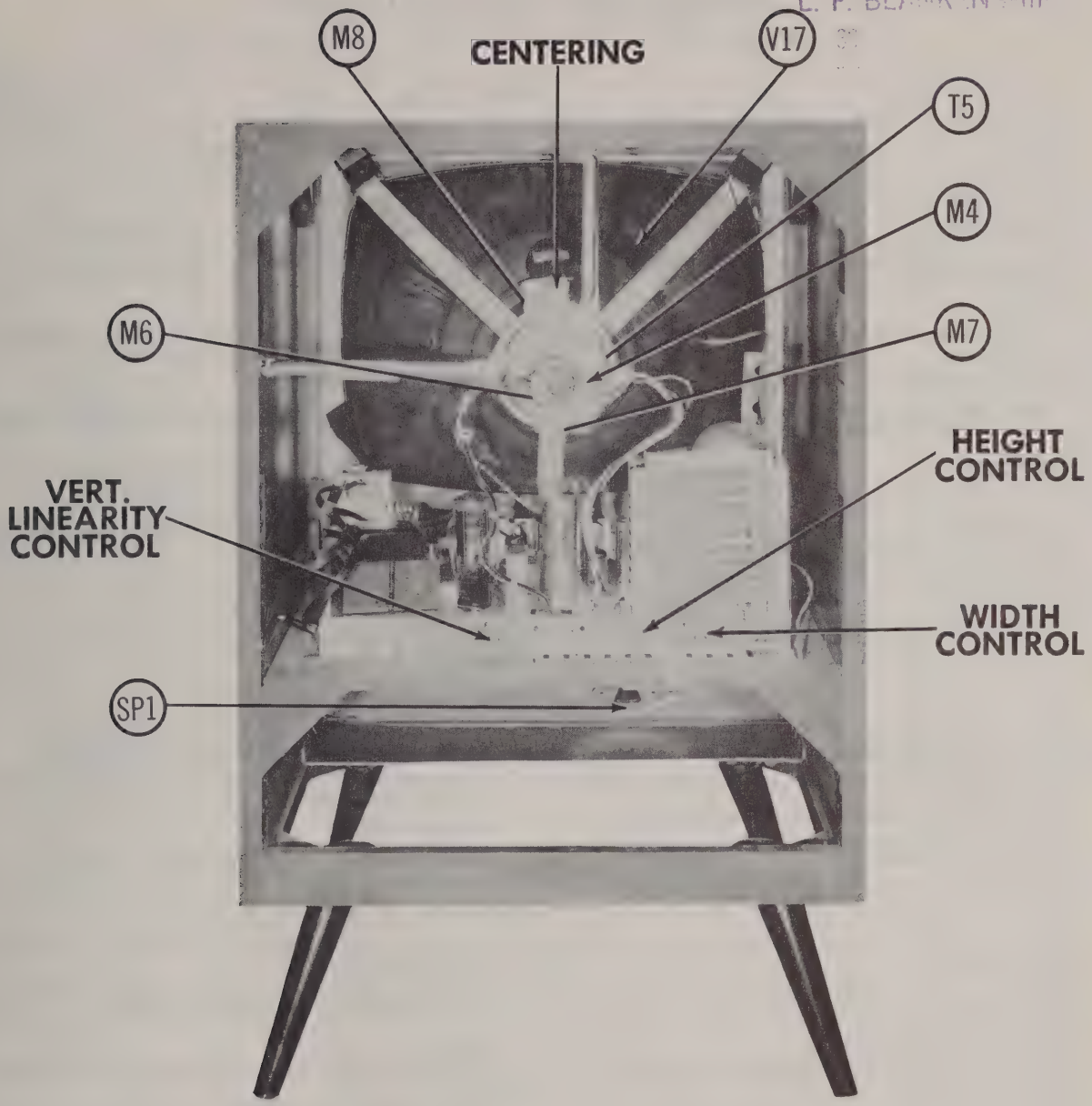

CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control at its mid-range position. Adjust the horizontal ringing coil slug (B1) until picture locks in across full range of horizontal hold control.

Adjust the horizontal width control for a picture slightly wider than necessary to fill the picture mask horizontally.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V13, V14 and V16. Check T3, T5A, R8, C71 and other associated components.

DRIVE LINES

Check by substitution V13 and V14. Check C70, C71, R87, R8 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V13 and V14. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V12, V13 and V14. Check C66 for open. Check L34, C67, R84 and other associated components.

XMAS TREE EFFECT

Check by substitution V12, V13 and V14. Check T3 and T5 for internal arcing. Check L34, C67, C69, C62, C63, R78, R83 and other associated components.

VERTICAL

LOSS OF SWEEP

Substitute V11. Check waveform W6.

If Satisfactory	If Unsatisfactory
Check T4, T5B, R91, R92 and other associated components.	Check T2, C56, R71, R7 and other associated components.

INSUFFICIENT SWEEP

Substitute V11. Check height and vertical linearity controls for proper operation. Check T4, T5B, R71 and other associated components.

COMPRESSED AT BOTTOM

Substitute V11. Check C59, R71, R7, R92, R91 and other associated components.

COMPRESSED AT TOP

Substitute V11. Check C1D, C59, R6 and other associated components.

FOLDS

Substitute V11. Check C58, C59, R6, T4, T5B and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Substitute V10. Check C52, C53, C54, R66 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Substitute V11. Check vertical integrator network. Check T2, C56, R70, R4 and other associated components.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V10 and V12. Check C61, C65, C67, L34, R84, R5 and other associated components.

HORIZONTAL BENDING

Check by substitution V10 and V12. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Substitute V6. Check C38, C41, C1C, C39, R42, R43, L29 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A6. Check video IF alignment.

POOR CONTRAST

Substitute V6. Check video crystal detector network. Check C38, C41, R49, L30, L28 and other associated components.

NEGATIVE PICTURE

Substitute V6. Check picture tube. Check video crystal detector network. Check C38, C41, R41, L26, L28 and other associated components.

SMEAR

Substitute V6. Check L25, L26, L28, L30, C40, C41 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5 and V6 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V7, V8 and V9. Check stages V8 and V9 using audio signal generator. Apply audio signal across R1.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF stages for component failure or change of value.	Check C49, C50, C51, R59, R62, T6, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A8 for minimum buzz. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. If filaments light, check by substitution V9 and V16. Check B+ filter and decoupling network. Check M1 fuse.

SMALL AND/OR DIM PICTURE

Check by substitution V9 and V16. Check B+ filter and decoupling network.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		PHILCO PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	6BQ7A	6BQ7A	9AJ	
V2	Osc.-Mixer	6X8	6X8	9AK	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Output	12BY7	12BY7	9BF	
V7	Sound IF Amp.	6AU6	6AU6	7BK	
V8	Ratio Det.-AF Amplifier-AGC Clamper	6T8	6T8	9E	
V9	Audio Output	6W6GT	6W6GT	7S	
V10	Sync Separator-Horiz. AFC	12AZ7	12AZ7	9A	
V11	Vert. Osc.-Vert. Output	12BH7	12BH7	9A	
V12	Horiz. Mult.	12AU7	12AU7	9A	
V13	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V14	Damper	6AX4GT	6AX4GT	4CG	
V15	HV Rectifier	1B3GT	1B3GT	3C	
V16	LV Rectifier	5U4G	5U4G	5T	

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CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA					RETMA BASE TYPE	NOTES
	PHILCO PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.		
V17	21WP4A ①	21WP4A ①	21WP4A ①	21WP4A	21WP4A ①	12N	① Aluminized Ch. TV-300 uses electrostatic focus tubes and Ch. TV-301 uses electromagnetic focus tubes.
		21WP4	21WP4	21WP4	21WP4	12N	
	21ZP4B ①	21ZP4B ①	21ZP4B ①	21ZP4B ①	21ZP4B ①	12N	
		21ZP4A	21ZP4A	21ZP4A	21ZP4A	12N	
	21XP4	21XP4	21XP4	21XP4	21XP4	12L	
		21XP4A ①		21XP4A ①		12L	
	21YP4A ①	21YP4A ①	21YP4 ①	21YP4A ①	21YP4A	12L	
		21YP4	21YP4	21YP4	21YP4	12L	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	PHILCO PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	▲40	400	30-2584-47				TM-4116		
B	■80	350							
C	▲100	200							
D	25	50							
C2	2	50	45-3035-4			TC302	TD-2-50	MT-1504	
C3A	5	150	30-2584-50			FP394	TM-T10-475	T-185	
B	■20	475				TC40	TD-4-150	MT-1504	
C	▲10	350							
C4	33		62-03340901l	D6-330	GP1K-330	UC-5433			
C5	1000		30-1245-6	MFT-1000					
C6	150		62-115001001	D6-151	GP2K-151	UC-5315			
C7	150		62-115001001	D6-151	GP2K-151	UC-5315			
C8	220		62-122001001	D6-221	GP2K-221	UC-5322			
C9	.5-3			829-3	3115-01-0R5	CT565A			
C10	150			D6-151	811-151	UC-5315			
C11	.62		30-1253-1						
C12	15								
C13	3.3			TCZ-3.3	NP0A-3R3	ZT-5533			
C14	1			TCZ-1	NP0A-010				
C15	27			TCZ-27	NP0L-270				
C16	.5-3			829-3	3115-01-0R5	CT565A			
C17	1.5		30-1224-127						
C18	2.2		30-1224-126	TCZ-2.2	NP0A-2R2				
C19	12		30-1224-128		N330K-120				
C20	12		30-1224-126		N330K-120				
C21	220		62-122001001	D6-221	GP2K-221	UC-5322			
C22	1000		30-1245-6	MFT-1000					
C23	5			TCZ-5	NP0A-050	ZT-555			
C24	10000		30-1238-2	DD-103	811-01	DC-511			
C25	680		62-16800101l	D6-681	GP2K-681	UC-5368			
C26	1000		30-1245-6	MFT-1000					
C27	1000		30-1245-6	MFT-1000					
C28	1-5		31-6520-9	829-6					
C29	680		62-16800101l	D6-681	GP2K-681	UC-5368		K-1368	
C30	2000		30-1238-12	DD-202	801-002	DC-522		C-1220	
C31	2000		30-1238-12	DD-202	801-002	DC-522		C-1220	
C32	680		62-16800101l	D6-681	GP2K-681	UC-5368		K-1368	
C33	2000		30-1238-12	DD-202	801-002	DC-522		C-1220	
C34	680		62-16800101l	D6-681	GP2K-681	UC-5368		K-1368	
C35	2000		30-1238-12	DD-202	801-002	DC-522		C-1220	
C36	2000		30-1238-12	DD-202	801-002	DC-522		C-1220	
C37	68		62-06840901l	D6-680	GP1K-680	UC-5468		K-1469	
C38	.047	200		DF-503		PT4147	IMP2-S47	3302147	
C39	3000		30-1238-16	DD-302	811-003	UC-523	IMP6-D3	C-1230	
C40	150		62-115001001	D6-151	GP2K-151	UC-5315		K-1350	
C41	.1	400	30-4650-47	DF-104		PT401	IMP4-P1	330401	
C42	.1	200	30-4650-47	DF-104		PT401	IMP2-P1	330201	
C43	10000		30-1238-2	DD-103	811-01	DC-511	IMP4-S1	330411	
C44	.22	200	30-4650-32			PT4022	IMP2-P22	3302022	Note 1
C45	10		62-010409001	D6-100	GP1K-100	UC-541		K-1410	
C46	18		62-018300001	TCZ-18	NP0K-180			KR-1418	
C47A	4000		30-1239	D6-402	822-004	DCD-524			
B	4000			D6-402					
C48A	330		30-1239-8	D6-331	GP2K-331	UC-5333		K-1333	
B	1500			D6-152	GP2L-152	UC-5215		C-1215	
C49	5000		30-1238-1	DD-502	811-005	DC-525	IMP6-D5	330625	
C50	3300			DD-332	811-0033	UC-5233	IMP6-D33	C-1233	
C51	10000		30-1238-2	DD-103	811-01	DC-511	IMP6-S1	330611	
C52	10000		30-1238-2	DD-103	811-01	DC-511	IMP6-S1	330611	

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PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP	RATING VOLT	REPLACEMENT DATA PHILCO PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C53	560	500	60-10565307					KR-1356	
C54	150		63-11500106L	D6-181	GPZK-181	UC-5315		K-1315	
C55A	2500		30-1239-0	D6-253	GP2-333-253	UC-5325		K-1325	
B	330			D6-331	GPZK-331	UC-5333		K-1335	
C56	.0068	400	30-4650-07	D6-683	GP2-333-663	UC-5368	IMPE-D68	3306368	Note 2
C57	.015	400				PT2115	IMPE-D15	3306115	
C58	.033	400				PT4133	IMPE-S3	3306133	
C59	.1	400	30-4650-47	DF-104		PT401	IMPE-P1	330401	
C60A	T090		30-1239-3	D6-681	GP2-333-663	UC-5368		3306368	
B	470			D6-471	GPZK-471	UC-5347		K-1347	
C61	150		63-11500106L	D6-181	GPZK-181	UC-5315		K-1250	
C62	180	500	60-10185477	TCZ-180	NPO-334-181	MCB227		K-1318	
C63	1000		30-1238-3	DD-102	801-001	DC-531	IMPE-D1	K-1230	
C64	3300	400		D6-332	GP2-333-332	PT2332	IMPE-D332	3306332	
C65	1000		30-1238-3	DD-102	801-001	DC-531	IMPE-D1	K-1210	
C66	10000		30-1235-3	DD-103	811-01	DC-511	IMPE-S1	C-0810	
C67	2300	500	60-20235434					CR-1222	
C68	82	500	60-06825347	TCZ-82	MPO-337-820			KR-1482	
C69	3900	500	60-10395417			MCB243		KR-1239	
C70	390	500	60-10395417			MCB243		KR-1239	
C71	1000		30-1238-3	DD-102	801-001	DC-531	IMPE-D1	K-1210	
C72	.047	400	30-4650-45	DF-503		PT4147	IMPE-S47	3304147	
C73	.01	600	30-4650-38	D6-103	GP2-333-103	PT411	IMPE-S1	330611	
C74	.01	600	30-4650-38	D6-103	GP2-333-103	PT411	IMPE-S1	330611	

Note 1. Runs 1 and 2 use .15MFD in this application (part #30-4651-31).
Note 2. Some versions use .033MFD in this application.

CONTROLS

ITEM No.	RATING RESIST-ANCE	RATING WATTS	REPLACEMENT DATA PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	390KΩ	½	33-5566-81	QI3-130	A47-350K-B	B-51-S	U-44	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	Not Req.	SWZ-12	Not Req.	UZ-25	Attach to R1A
R2A	15KΩ	½	33-5572-15	QI3-115XX		ABT-154		Contrast tapped at 11KΩ
B	Shaft		Not Req.	Not Req.		AK-3		Attach to R2A
R3A	100KΩ	½	33-5572-16	QI1-132	A47-100K-B	B-60	U-41	Brightness
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R3A
R4A	1Meg	½	33-5572-10	QI1-137	A47-1Meg-S	B-69	U-54	Vertical hold
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R4A
R5A	50KΩ	½	33-5572-8	QI1-123	A47-50K-S	B-31	U-35	Horiz. Hold
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R5A
R6	6000Ω with 1000Ω strap	1	67-0025					Vert. Linearity (Wire wound)
R7A	2.5Meg	½	33-5572-1	QI1-339	A47-2.5Meg-S	BX-83	U-355	Height
B	Shaft		Not Req.	Not Req.	FKZ-1/4	Not Req.	R15ML	Attach to R7A
R8	12.5KΩ	2	33-5574	WK-12500				Width (Wire wound)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA PHILCO PART No.	IRC PART No.	NOTES
R9	470KΩ	½	66-4478340	BTS-470K	
R10	22KΩ	½	66-3228340	BTS-22K	
R11	470KΩ 5%	½		BTS-470K 5%	
R12	1800Ω	1		BTS-1800	
R13	470KΩ 5%	½	66-4478340	BTS-470K 5%	
R14	680Ω	½		BTS-680	Note 1
R15	220Ω	½		BTS-220	
R16	1500Ω	½		BTS-1500	
R17	3300Ω	½		BTS-3300	
R18	100KΩ	½	66-4108340	BTS-100K	
R19	8200Ω	½	66-3828340	BTS-8200	
R20	8200Ω	½	66-3828340	BTS-8200	
R21	22KΩ	½	66-3228340	BTS-22K	
R22	47KΩ	1		BTA-47K	
R23	150KΩ	½		BTS-150K	
R24	220Ω	½		BTS-220	
R25	150Ω	½		BTS-150K	
R26	47KΩ	½		BTS-47K	Note 1
R27	1000Ω	½	66-2108340	BTS-1000	
R28	15KΩ	½	66-3158340	BTS-15K	
R29	47Ω	½	66-0478340	BTS-47	
R30	330Ω	½	66-3338340	BTS-330	
R31	1000Ω	½	66-2108340	BTS-1000	
R32	47KΩ	½	66-3478340	BTS-47K	
R33	47Ω	½	66-0478340	BTS-47	
R34	330Ω	½	66-3338340	BTS-330	
R35	180Ω	½	66-1188340	BTS-180	
R36	1000Ω	½	66-2108340	BTS-1000	
R37	3900Ω	½	66-3398340	BTS-3900	
R38	3300Ω	½		BTS-3300	
R39	6800Ω	½	66-3688340	BTS-6800	
R40	470KΩ	½	66-4478340	BTS-470K	
R41	100Ω	½	66-1008340	BTS-100	
R42	18KΩ	½	66-3188340	BTS-18K	
R43	6800Ω	½	66-3688340	BTA-6800	
R44	5.3Meg 5%	½	66-5828340	BTS-5.3Meg 5%	
R45	1Meg	½	66-4108340	BTS-1Meg	Note 2
R46	10Meg	½	66-6108340	BTS-10Meg	
R47	470KΩ	½		BTS-470K	Note 3
R48	5.3Meg	½	66-5328340	BTS-5.3Meg	
R49	2300Ω	½		BTS-2300	
R50	220KΩ	½		BTS-220K	
R51	150KΩ	½	66-4158340	BTS-150K	
R52	6800Ω	½	66-3688340	BTS-6800	
R53	2700	½	66-1278340	BTS-270	
R54	3750Ω	½	66-3378340	BTS-375	
R55	330Ω	½	66-3338340	BTS-33K	
R56	120Ω	½	66-1228340	BTS-120	
R57	47KΩ	½	66-3478340	BTS-47K	
R58	10Meg	½	66-6108340	BTS-10Meg	
R59	270KΩ	½		BTS-270K	
R60	1000Ω	½	66-3108340	BTS-1000	
R61	1.5Meg	½	66-5158340	BTS-1.5Meg	
R62	220Ω	1	66-4224340	BTA-220	
R63	1Meg	½	66-5108340	BTS-1Meg	
R64	330KΩ	½	66-4338340	BTS-330K	
R65	10KΩ	½	66-3108340	BTS-10K	
R66	150KΩ	½	66-4158340	BTS-150K	
R67	15KΩ	½	66-3158340	BTS-15K	
R68	2300Ω	½	66-3828340	BTS-8200	
R69	33KΩ	½	66-3338340	BTS-33K	
R70	680KΩ	½		BTS-680K	Note 4
R71	1Meg	½	66-5108340	BTS-1Meg	
R72	10MΩ	½		BTS-10M	
R73	2.2Meg	½	66-5228340	BTS-2.2Meg	
R74	56KΩ	½	66-3568340	BTS-56K	
R75	56KΩ	½	66-3568340	BTS-56K	
R76	1000Ω	½		BTS-1000	
R77	1000Ω	½		BTS-1000	
R78	180KΩ	½	66-4188340	BTS-180K	
R79	680KΩ	½	66-4688340	BTS-680K	
R80	4.7Meg	½	66-5478340	BTS-4.7Meg	
R81	220KΩ	½	66-4228340	BTS-220K	
R82	5600Ω	3	66-3568340	BTS-5600	
R83	15KΩ	½	66-3158340	BTS-15K	
R84	68KΩ	½		BTS-68K	
R85	47KΩ	½	66-3478340	BTS-47K	
R86	4700Ω	½	66-2478340	BTS-4700	
R87	180KΩ	½	66-4188340	BTS-180K	
R88	56KΩ	1	66-3568340	BTA-56K	
R89	1Meg	½	66-5108340	BTS-1Meg	
R90	39KΩ	½	66-3398340	BTS-39K	
R91	4700Ω	2	66-2468340	BTS-4700	
R92	5600Ω	3	66-3568340	BTS-5600	
R93	560Ω	½	66-1568340	BTS-560	
R94	3.3Ω	1			
R95	100KΩ	3	66-4108340	BTB-100K	

Note 1: Not used in some versions.
Note 2: Run 1 and run 2 use a 1.5Meg resistor in this application.
Note 3: Run 1 and run 2 use a 560KΩ resistor in this application.
Note 4: Run 1 uses a 470KΩ resistor in this application.

TRANSFORMER (POWER)

ITEM No	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA PHILCO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC 60 ~ 1.82A	634VCT @ .200ADC	5VAC @ 3A	32-8673						
		SEC. 3	SEC. 4	SEC. 5						
		6.3VAC @ 6.4A								

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	PHILCO PART No	Halldorson PART No	Merit PART No	RCA TYPE No	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No
T2	Vert. Osc. Trans.	32-8676		A-3004 ①		V404 ① ②	A-8126 ①	26A09 ①	
T3	Horiz. Output Trans.	32-8677	F3414* & RF800	RV0-2 ③	232T1*		A-8220* ③	FLY-P & WC-20	D-24* & WC-11
T4	Vert. Output Trans.	32-8650	21804	A-3037	227T1	V313	A-8123	26B52	A-025X
T5A	Yoke-Horiz. (30MH)	32-9680	DF604 ⑤	MDF-71 ⑤		Y70F30 ⑤	DY-12A ⑤	Y-12 ⑤	Y-24 ⑤
B	Vert. (43.5MH)	32-9670 ④							

① Connect red lead to yellow lead. Connect blue lead to ground; red and yellow leads to cathode and green lead to grid capacitor.
② Drill new mounting hole(s).
③ Fabricate new mounting bracket.
④ Alternate yoke used in models 22C4124 and 22C4124L.
⑤ Use original yoke network.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL (CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
4	3	4	1137 Rectifier Plate Lead		4	3	1B3 Rectifier Plate Lead
3	2	3	10		3	2	9
13	8	2	8		2	8	5
6	7	8	See Note ⑥		8	7	T
1	1	1	2		1	1	1
7	#3 Term. RF800 #4 Term. RF800	7	1		7	#1 Term. WC-20 #2 Term. WC-20	Black Term. WC-11 Orange Term. WC-11
8	6	6	2		6	8	11
Special Note:	⑦ ⑧				⑦ ⑨	⑦ ⑩	⑦ ⑩

⑥ Connect terminals #1 & #2 of RF800 across terminals #5 & #6. If picture is out of phase, reverse primary or secondary.
⑦ Connect original L35 in series with 6BQ6 plate lead. Connect original L37 in series with damper cathode.
⑧ Connect a 565MMF capacitor in series with open end of R32 and connect to terminal #6. (Read lead of yoke.)
⑨ Connect terminals #3 & #4 of WC-20 across terminals #5 & #6. If picture is out of phase, reverse primary or secondary.
⑩ Connect terminal #7 to terminal #8.
⑪ Connect red & blue terminals of WC-11 across terminals #1 & #3. If picture is out of phase, reverse primary or secondary.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA PHILCO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T6	2.4KΩ	3.4Ω	32-8674	A-3332	A-3025	S-12X	Z1101	26B58	

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA PHILCO PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	6"	PM	3.4Ω	36-1641-12 ① 36-1651-5 ① 45-9736 ② 36-1651-10 ③	8T-108 Mod. P6-X	6A1	① Speaker used in models 22C4134 and 22C4124L. ② Speaker used in models 22C4130, 22C4130L, 22C4310 and 22C4119. ③ Used in model 22C4123.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA PHILCO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	VHF Ant. Matching trans	.6Ω	.6Ω	32-4623-3				
L2	VHF Ant. Matching trans	.6Ω	.6Ω	32-4623-3				
L3	IF Trap	0Ω						Wound on 22MMF cap. Complete assembly including coils.
L4	VHF Ant.Coils	0Ω		76-9345				
L5	VHF Ant.Coil	0Ω		76-9345				
L6	VHF Ant.Coil	0Ω		76-9345				
L7	UHF IF Coupling	0Ω		32-4623-56				
L8	UHF IF Coupling	0Ω		32-4623-55				Channel 13; Part of complete assembly. Complete assembly including coils. Channel 8; Part of complete assembly.
L9	Neut. Coil	0Ω		32-4623-50				
L10	VHF RF Coil	0Ω		76-8956				
L11	VHF RF Coils	0Ω		76-8956				
L12	VHF RF Coil	0Ω		76-8956				

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA PHILCO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L13	VHF Mixer Grid Coil	0Ω		76-8955				Channel 13; Part of complete assembly.
L14	VHF Mixer Grid Coils	0Ω		76-8955				Complete assembly.
L15	VHF Mixer Grid Coil	0Ω		76-8955				Channel 3; Part of complete assembly.
L16	VHF Mixer Grid Coil	0Ω		76-8955				Channel 6; Part of complete assembly
L17	VHF Osc. Coils	0Ω		32-4623-50				
L18	RF Choke	0Ω		32-4629-1				Tapped
L19	RF Choke	0Ω						
L20	Video IF Coupling	.1Ω		32-4597-3	19-3001	TV-189	6175	.86 Microhenries
L21	2nd Video IF	.1Ω	.1Ω	32-4446-46	19-4522		6219	3 Microhenries
L22	Fil. Choke	.1Ω		32-4113-49	19-1002		4606	
L23	3rd Video IF	.1Ω	.1Ω	32-4446-46	19-4522		6219	
L24	4th Video IF	.1Ω	.1Ω	32-4446-47	17-4524		6219	
L25	Series Peaking Coil	2.2Ω		32-4630	19-4022		6182	22 Microhenries
L26	Shunt Peaking Coil	8Ω		32-4480-5	19-3250	TV-185	6181	250 Microhenries
L27	4.5MC Trap	1.7Ω		32-4663-11	20-1004	TV-151	1469	
L28	Series Peaking Coil	8Ω		32-4480-4	[illegible]	TV-185	6181	[illegible]
L29	Shunt Peaking Coil	7Ω		32-4480-9	19-4400	TV-190	4548	400 Microhenries
L30	Series Peaking Coil	4.8Ω		32-4480-5	19-3250	TV-185	6181	250 Microhenries
L31	RF Choke	1Ω						
L32	Sound IF	4.1Ω		32-4663-14	17-3412			
L33	Ratio Det.	7.5Ω	10CT	32-4651A	17-3497	TV-125	6305	Tertiary winding = L.3Ω
L34	Horiz. Osc.	180Ω		32-4557-4	19-1578	TV-163	6319	
L35	RF Choke	1.8Ω			19-1005		4612	12 Microhenries
L36	RF Choke	1.8Ω			19-1005		4612	12 Microhenries Wound on 270 resistor.
L37	RF Choke	2.4Ω						

FILTER CHOKE

ITEM No	RATINGS TOTAL CURRENT	RATINGS D.C RESISTANCE	RATINGS INDUCTANCE @ CURRENT (1000 ~)	REPLACEMENT DATA PHILCO PART No	Stancor PART No	Merit PART No	Triad PART No	Halldorson PART No	Thordarson PART No
L38	.200A	72.5Ω	1.18H	32-8675	C-2527	C-2994	C-21X ①	C5040 ①	28C41

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA PHILCO PART No. FUSE	PHILCO PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG SLO BLO	7/10A 250V	AD-3246-18		313.750 (3AG-750A-SLO-BLO)	357001	MDL 7/10	4406

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA PHILCO PART No.	SYLVANIA PART No.	NOTES
M2	1N64P	34-8023	1N90 or 1N32	Video Det.

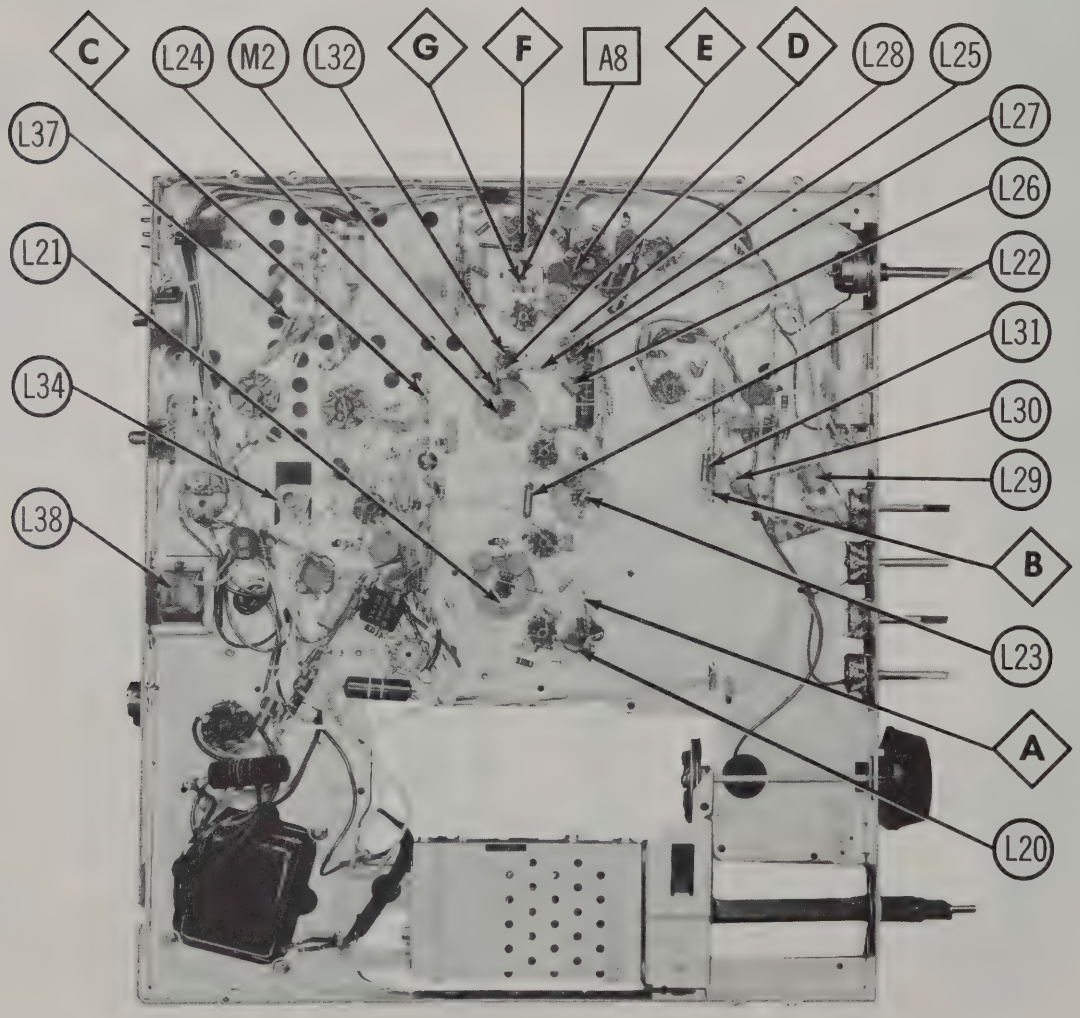
MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M3	Tuner	76-8948-1	VHF - Models 22C4119, 22C4120, 22C4120L, 22C4123, 22C4124, 22C4310, 22C4310L
	Tuner	76-8946-2	VHF - Model 22C4124L
M4	Focus Magnet	76-9014	Includes centering device - Ch. 301
M5	Centering Magnet	76-8998	Ch. 300
M6	Ion Trap	76-8077-2	Models 22C4134, 22C4134L, 22C4130, 22C4130L, 22C4310, 22C4119
	Ion Trap	76-8077-5	Models 22C4123, 22C4310L
M7	Correction Magnet	76-9474	Ch. 301
M8	Correction Magnet	76-8474	Ch. 300
	Cabinet	11077-3	Model 22C4310L
	Cabinet	11065-3	Model 22C4123
	Cabinet	11060-1	Model 22C4124L
	Cabinet	11060	Model 22C4124
	Cabinet	11073-1	Model 22C4120L
	Cabinet	11072	Model 22C4120
	Cabinet	11077	Model 22C4310
	Cabinet	11073-2	Model 22C4119
	Knob	54-8157-1	Brightness - Models 22C4123, 22C4310, 22C4119
	Knob	54-8157-1	Brightness - Models 22C4310L, 22C4130, 22C4130L
	Knob	54-8160-1	Brightness - Models 22C4124
	Knob	54-8160-3	Brightness - Model 22C4124L
	Knob	76-9118-7	Channel Selector - Model 22C4123
	Knob	76-9118-8	Channel Selector - Model 22C4310L
	Knob	76-9118	Channel Selector - Models 22C4134, 22C4310
	Knob	76-9118-1	Channel Selector - Models 22C4124L, 22C4120, 22C4130L
	Knob	76-9118-5	Channel Selector - Model 22C4119
	Knob	54-8157	Contrast - Models 22C4123, 22C4310, 22C4119
	Knob	54-8157-1	Contrast - Models 22C4310L, 22C4120, 22C4130L
	Knob	76-8313-6	Contrast - Models 22C4134, 22C4124L
	Knob	76-8304-9	Fine tuning - Models 22C4123, 22C4310L, 22C4120, 22C4130L, 22C4[illegible]

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS (cont)

ITEM No.	PART NAME	PHILCO PART No.	NOTES
	Knob	76-6104-5	Fine tuning - Models 22C4124, 22C4124L
	Knob	54-4825-6	Fine tuning - Model 22C4119
	Knob	54-6157	Horiz. Hold - Models 22C4123, 22C4310, 22C4119
	Knob	54-6157-1	Horiz. Hold - Models 22C4310L, 22C4120, 22C41206
	Knob	54-6140-1	Horiz. Hold - Models 22C4124, 22C4124J,
	Knob	54-6157	Vert. Hold - Models 22C4123, 22C4310, 22C4119
	Knob	54-6157-1	Vert. Hold - Models 22C4310L, 22C4120, 22C4120L
	Knob	54-6140-1	Vert. Hold - Model 22C4124
	Knob	54-6140-3	Vert. Hold - Model 22C4124L
	Knob	76-9237-1	On-off-volume - Models 22C4123, 22C4310
	Knob	76-9237-2	On-off-volume - Models 22C4310L, 22C4120, 22C4120L
	Knob	54-6137	On-off-volume - Model 22C4124
	Knob	54-6137-1	On-off-volume - Model 22C4124L
	Knob	76-9237-3	On-off-volume - Model 22C-4119
	Safety Glass	54-9213-47	Model 22C4123
	Safety Glass	54-9213-46	Model 22C4310L
	Safety Glass	54-9213-37	Models 22C4124, 22C4124L
	Safety Glass	54-9213-40	Models 22C4120, 22C4120L, 22C4310
	Safety Glass	54-9213-41	Model 22C4119
	Mask	28-10075-2	Model 22C4123
	Mask	28-10075-16	Model 22C4310L
	Mask	28-9376-12	Model 22C4124
	Mask	28-9376-13	Model 22C4124L
	Mask	28-10075-4	Models 22C4120, 22C4120L
	Mask	28-10075-5	Model 22C4310
	Mask	28-9931-9	Model 22C4119



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3921 MEADE ST.
DENVER, COLORADO

TROUBLE SHOOTING AIDS (cont)

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V9, V12, V13, V14 and V15. Check waveform W13.

If Satisfactory	If Unsatisfactory
Check T3, T5A, C72, L37, R8 and other associated components.	Check L34, C67, C69, C71, R86, R85, R83, R82 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V9, V13, V14 and V16. Check T3, T5A, C71, R8, R86, R85 and other associated components.

BLOOMING

Check by substitution V13, V14, V15 and V16. Check T3, C71, C69, R90, R8 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5, V6 and V9. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

KEYSTONE EFFECT

Check T5 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

PRODUCTION CHANGES

To reduce snow and increase picture quality in fringe areas, it is recommended that the following changes be made on those chassis types 300-301 runs below 10R.

R48 was decreased from 18KΩ to 6800Ω.

R41 was decreased from 100Ω to 82Ω.

A 1Meg resistor was added from pin 1 (cathode) to pin 2 (grid) of V6 (12BY7), L31 (pin 11 of V17) was removed.

L29 and L30 have been reversed and R52 has been increased to 10KΩ.

R43 was omitted and L29 was connected to the 260V line.

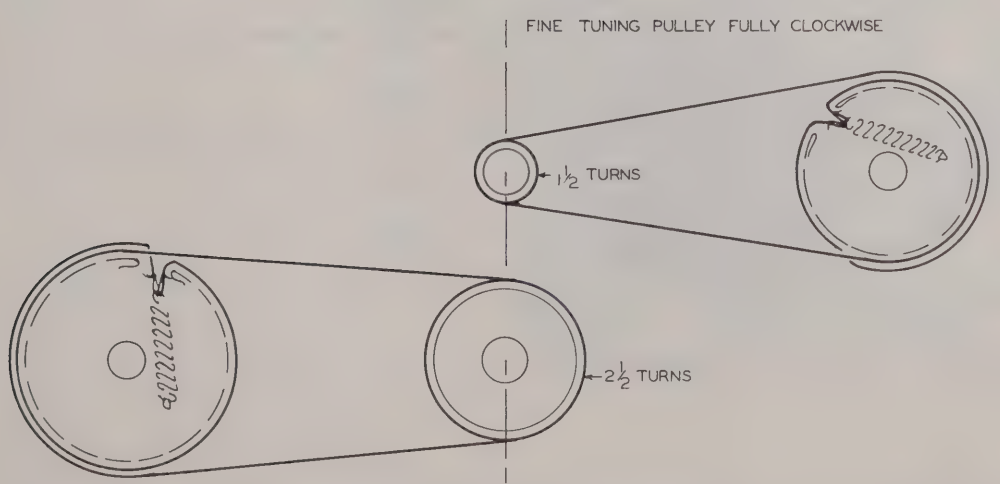
The junction of C52 & R44 which was formerly connected to the junction of L29 & R43 was broken and connected to a 5600Ω 2 watt resistor. The other end of this resistor was then connected to the 260V line.

L29 was disconnected from the 260V line and a 1200Ω ½ watt resistor was added from L29 to the 260V line.

R45 was changed to a 1.5Meg resistor. In some runs, a 1Meg resistor was used.

R46 was decreased from 10Meg to 6.8Meg.

R38, R39 and L28 have been omitted.



DRIVE CORD STRINGING

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF Tuner Oscillator Circuit may be accomplished by removing the Channel Selector and Fine Tuning knobs.

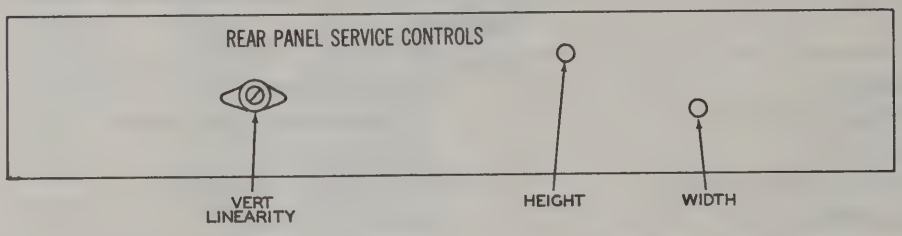
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 3 wood screws holding metal strip at the top of the safety glass. Remove metal strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions.)

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the Horizontal Oscillator, it is necessary to remove the rear cover and supply power to set. Adjustment is located on top of chassis. Set the Horiz. Hold Control at the center of its range and adjust the Horiz. Osc. slug L34 until picture synchronizes horizontally. (For location see tube placement chart.)

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate Sound IF Detector Buzz, adjust the Ratio Detector Secondary (L33) located on top of chassis. (See tube placement chart.)

FUSES

One fuse is used for LV Power Supply protection. (For location see tube placement chart.)

CENTERING

Centering is accomplished mechanically by means of a centering lever on the P. M. Focusing assembly. Adjust the centering lever from side to side and up and down until the picture is properly centered.

ANTI-PIN CUSHION ADJUSTMENT

Reduce the picture size so that the sides of the raster are visible and position the magnets so that all sides are straight lines and the corners are at right angles.

DISASSEMBLY INSTRUCTIONS

1. Remove 3 push-on type control knobs from front panel of cabinet.
2. Remove 2 metal screws from front control panel.
3. Remove panel and 4 push-on type control knobs.
4. Remove 6 wood screws from rear cover. Remove rear cover.
5. Disconnect yoke socket, picture tube socket, HV lead and 2 speaker leads.
6. Remove 5 chassis bolts. Remove chassis.
7. Remove 2 speaker nuts. Remove speaker.

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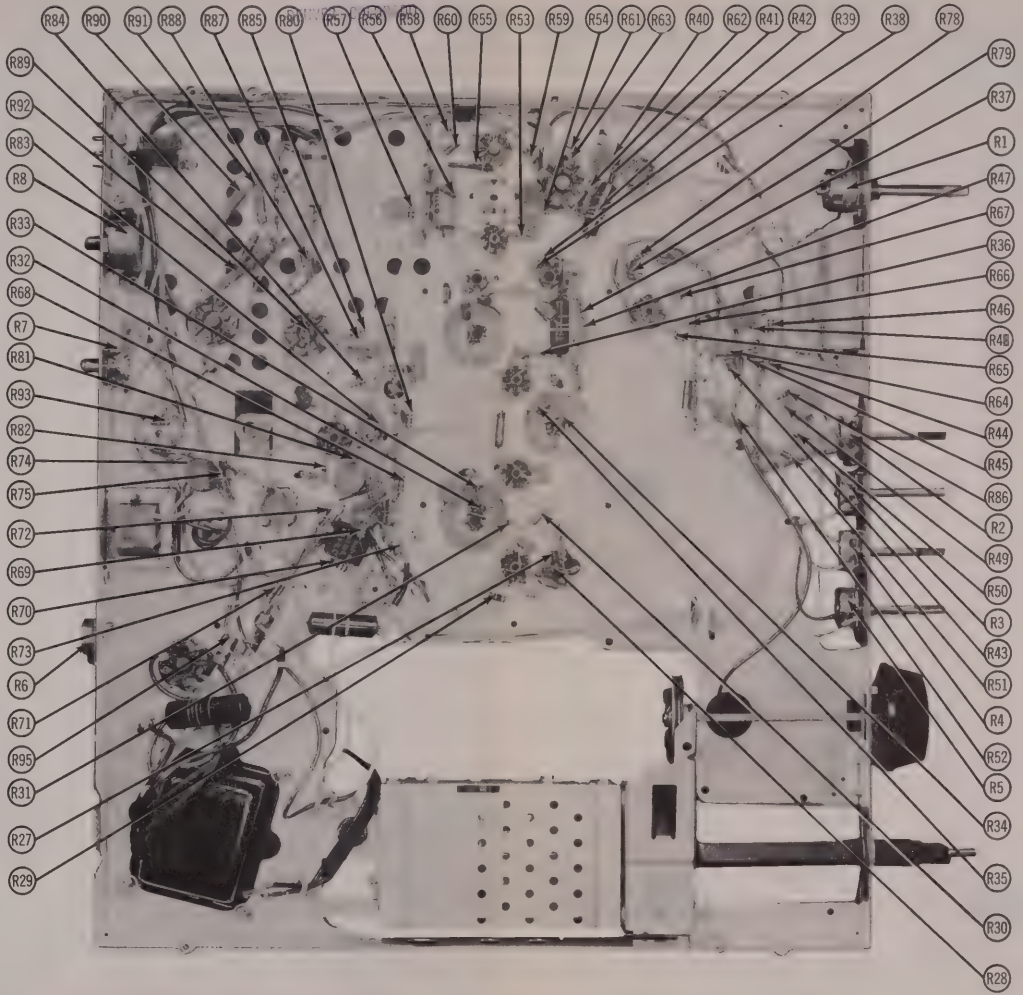

CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3884 MEADE ST.
DENVER, COLORADO

PILOT
MODEL AA-904

PILOT
MODEL AA-904

TRADE NAME	Pilot Model AA-904
MANUFACTURER	Pilot Radio Corp., 37-06 36th. St., Long Island City, N.Y.
TYPE SET	AC Operated 30 Watt Audio Amplifier
TUBES (Five)	Types 6SN7GT AF Amp.-Phase Inverter, 6SN7GT Driver, (2) KT66 Output, 5U4G Rectifier
POWER SUPPLY	105-120 Volts AC-60 Cycles RATING 1.21 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

PILOT
MODEL AA-904

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		PILOT PART No.	STANDARD REPLACEMENT		
V1	AF Amplifier-Phase Inverter	6SN7GT	6SN7GT	8BD	
V2	Driver	6SN7GT	6SN7GT	8BD	
V3	Audio Output	KT66	KT66	7S	
V4	Audio Output	KT66	KT66	7S	
V5	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	PILOT PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1	40	250				TC58	TD-40-250	FM-2540	
C2A	▲40	450				FP377	TM-8040-450	Q-065	
B	■80	450				TC78	TM-40-450		
C	▲40	450							
C3	80	250				TCD-2274	TD-80-350	MT-25100	
C4A	▲10	475				FP398.2	TM-401010-500	Q-075	
B	■10	475				TC3501	TD-100-50	MTH-5010	
C	▲40	475							
D	100	50							
C5	50			D6-500	GP1K-500	UC-545		K-1450	
C6	330			D6-331	GP2K-331	UC-5333		K-1330	
C7	.25	600				PT6025	IMP6-P25	3306025	
C8	.25	600				PT6025	IMP6-P25	3306025	
C10	.25	600				PT6025	IMP6-P25	3306025	
C11	500			D6-501	GP2K-501	UC-535		K-1350	
C12	330			D6-331	GP2K-331	UC-5333		K-1333	

CONTROLS

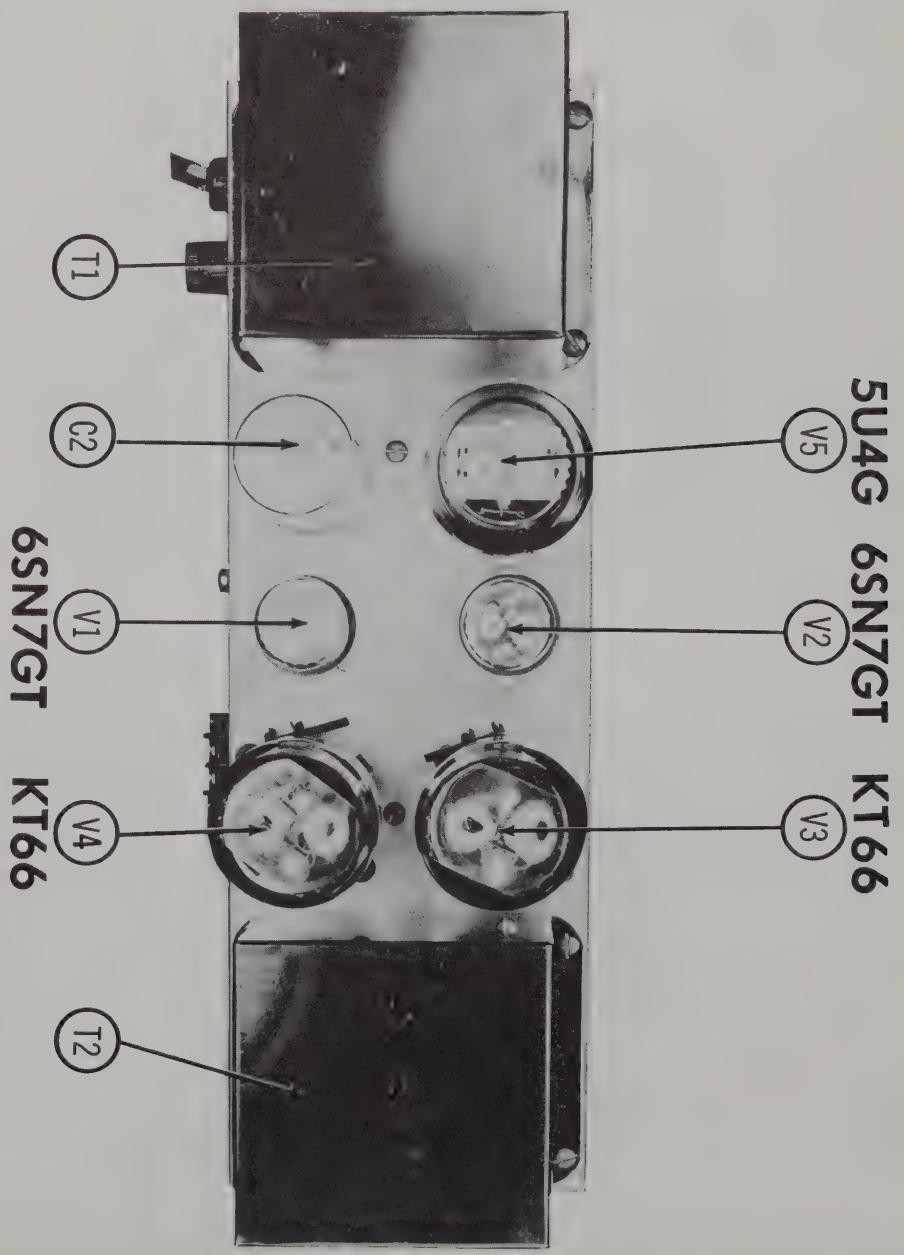
ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	PILOT PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	100Ω	2	39-31	W-100	A43-100	VK-121	R100L	Tube bias wire-wound
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R1A
R2A	100Ω	2	39-31	W-100	A43-100	VK-121	R100L	Tube balance wire-wound
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R2A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	PILOT PART No.	IRC PART No.	
R3	470KΩ	½		BTS-470K	
R4	22KΩ	½		BTS-22K	
R5	470Ω	½		BTS-470	
R6	47KΩ	1		BTA-47K	
R7	27KΩ	1		BTA-27K	
R8	27KΩ 5%	1		BTA-27K 5%	
R9	27KΩ 5%	1		BTA-27K 5%	
R10	27KΩ	2		BTB-27K	
R11	680KΩ	½		BTS-680K	
R12	3300Ω	½		BTS-3300	
R13	47KΩ 5%	2		BTB-47K 5%	
R14	680KΩ	½		BTS-680K	
R15	47KΩ 5%	2		BTB-47K 5%	
R16	100KΩ	½		BTS-100K	
R17	1000Ω	½		BTS-1000	
R18	150Ω 2%	2			
R19	82Ω	½		BTS-82	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	PILOT PART No.	IRC PART No.	
R20	100Ω	1		BTA-100	
R21	100Ω	1		BTA-100	
R22	100KΩ	½		BTS-100K	
R23	1000Ω	½		BTS-1000	
R24	150Ω 2%	2			
R25	82Ω	½		BTS-82	
R26	6800Ω	1		BTA-6800	
R27	2200Ω	½		BTS-2200	
R28	6000Ω	10		1 3/4A-6000	
R29	9000Ω	10		1 3/4A-9000	
R30	30KΩ	20		2D-30K	
R31	330KΩ	½		BTS-330K	
R32	680KΩ	1		BTA-680K	
R33	100Ω	5			
R34	100KΩ	1		BTA-100K	
R35	270KΩ	1		BTA-270K	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	PILOT PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @1.21A	800VCT .148ADC	5VAC @3A	6.3VCT @3.6A		P-6143 ①				24R02

① Drill new mounting holes.

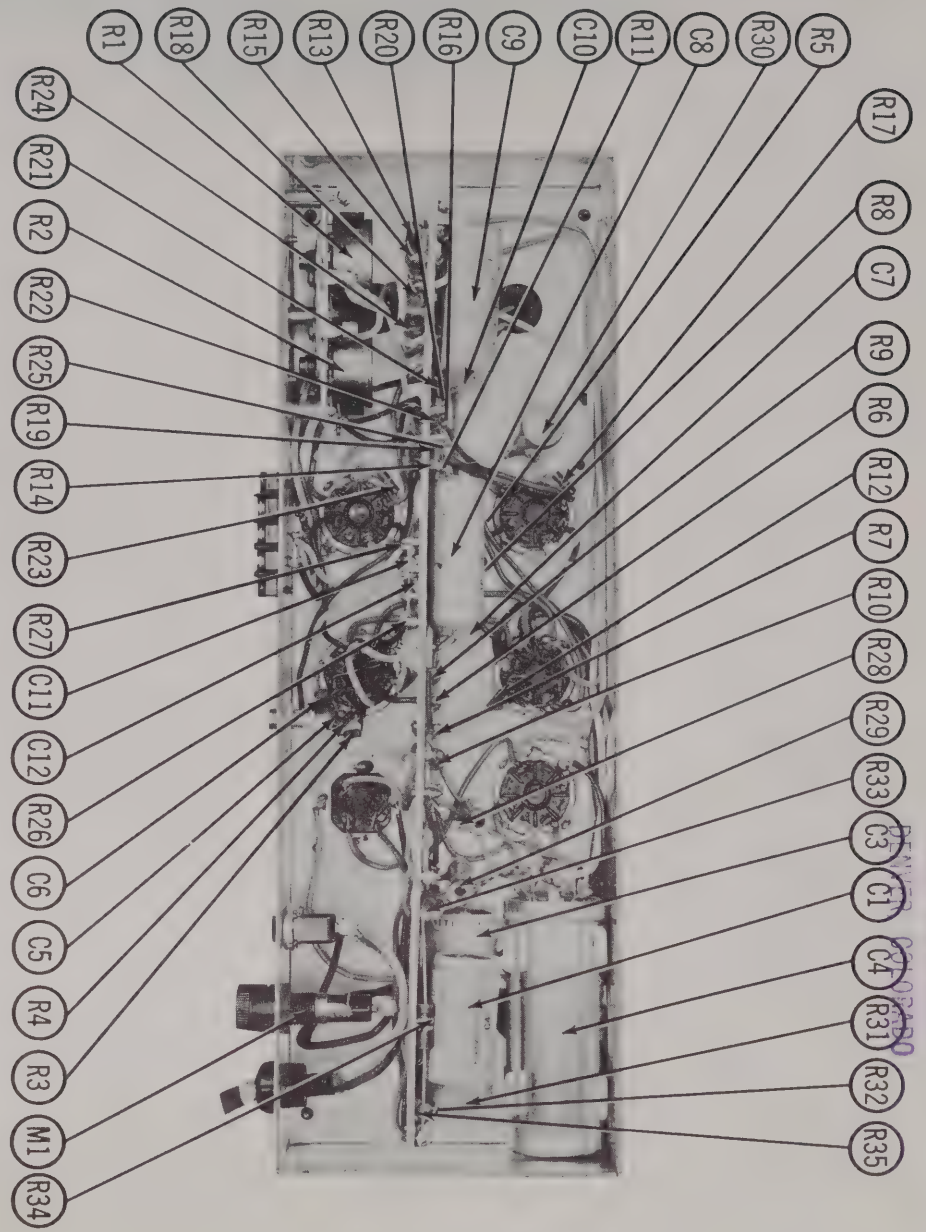
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	PILOT PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	7.6KΩ CT	16Ω tap @ 8Ω							

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			PILOT PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	2½A 125V			31302.5 (3AG S/B 2½A)	342001	MDL2½	HKP

CHASSIS—BOTTOM VIEW



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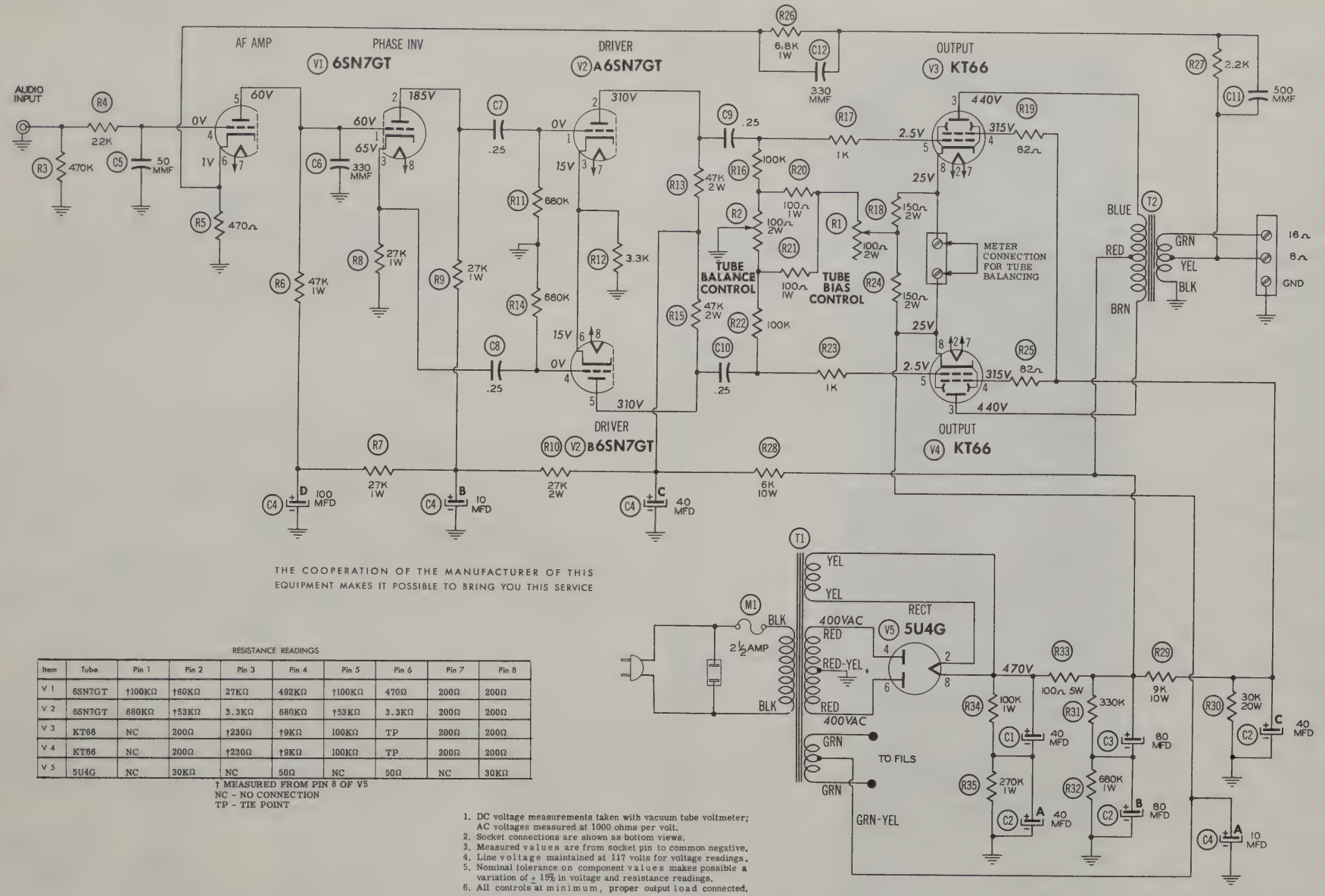

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6SN7GT	†100KΩ	†60KΩ	27KΩ	492KΩ	†100KΩ	470Ω	200Ω	200Ω
V 2	6SN7GT	680KΩ	†53KΩ	3.3KΩ	680KΩ	†53KΩ	3.3KΩ	200Ω	200Ω
V 3	KT66	NC	200Ω	†230Ω	†9KΩ	100KΩ	TP	200Ω	200Ω
V 4	KT66	NC	200Ω	†230Ω	†9KΩ	100KΩ	TP	200Ω	200Ω
V 5	5U4G	NC	30KΩ	NC	50Ω	NC	50Ω	NC	30KΩ

† MEASURED FROM PIN 8 OF V5
NC - NO CONNECTION
TP - TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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*TRADE MARK

RETMA MEMBER

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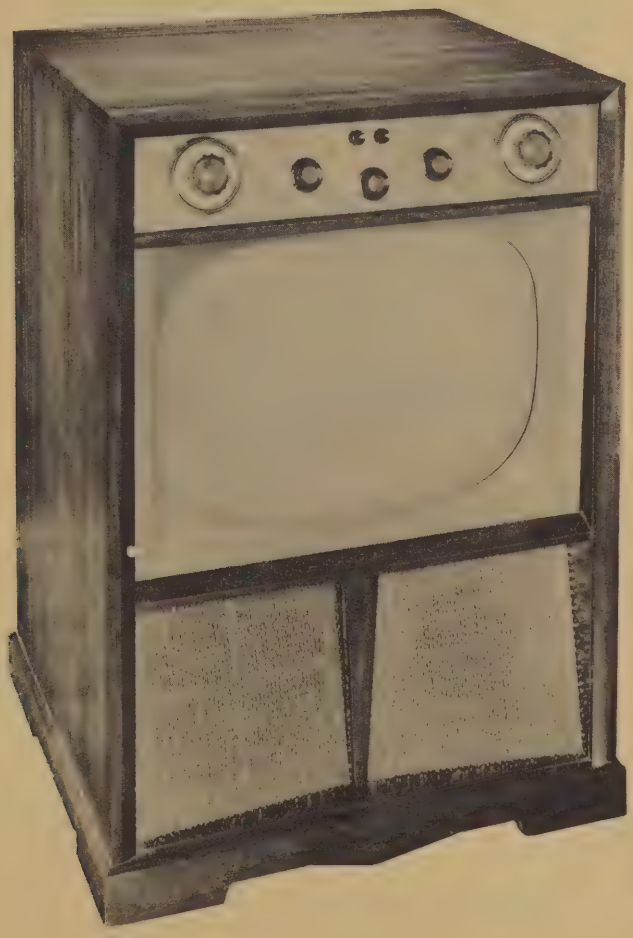

MODEL 552

SETCHELL-CARLSON MODELS 551, 552, 553, 5501, 5502, 5503 (Ch. 155)

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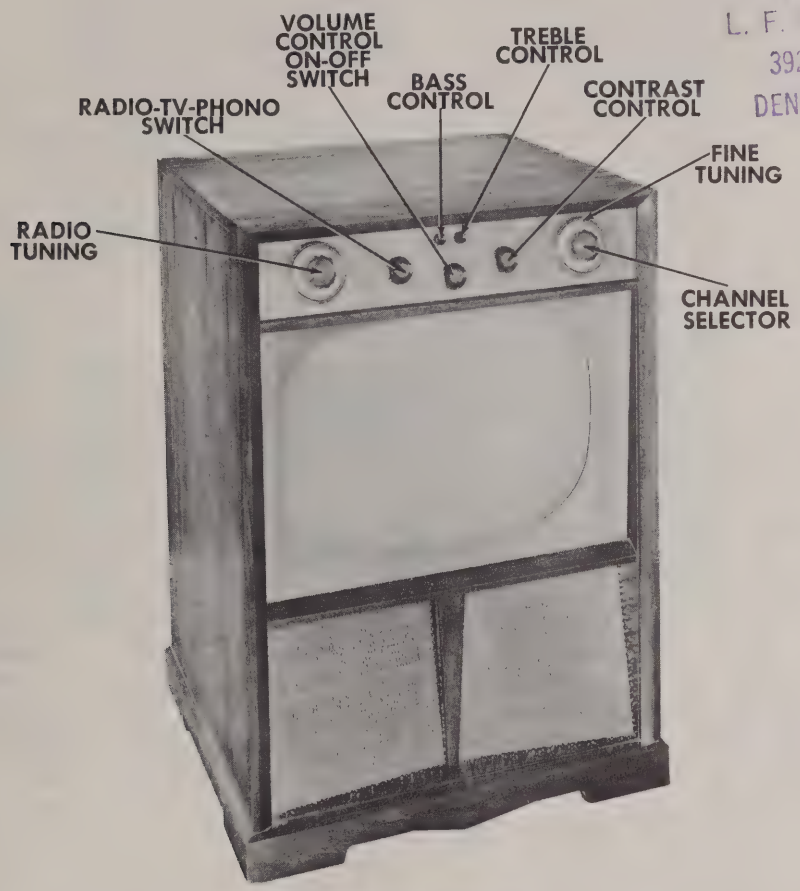

SETCHELL-CARLSON MODEL 552

TRADE NAME	Setchell-Carlson Models 551, 552, 553, 5501, 5502, 5503 (Ch. 155)
MANUFACTURER	Setchell-Carlson Inc., New Brighton, Minnesota
TYPE SET	Television Receiver With Built-in AM Radio
TUBES	Twenty-Eight
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.72 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 Video IF 48.75MC, Sound IF 44.25MC (Intercarrier) AM Radio 535-1620KC, AM IF 456KC

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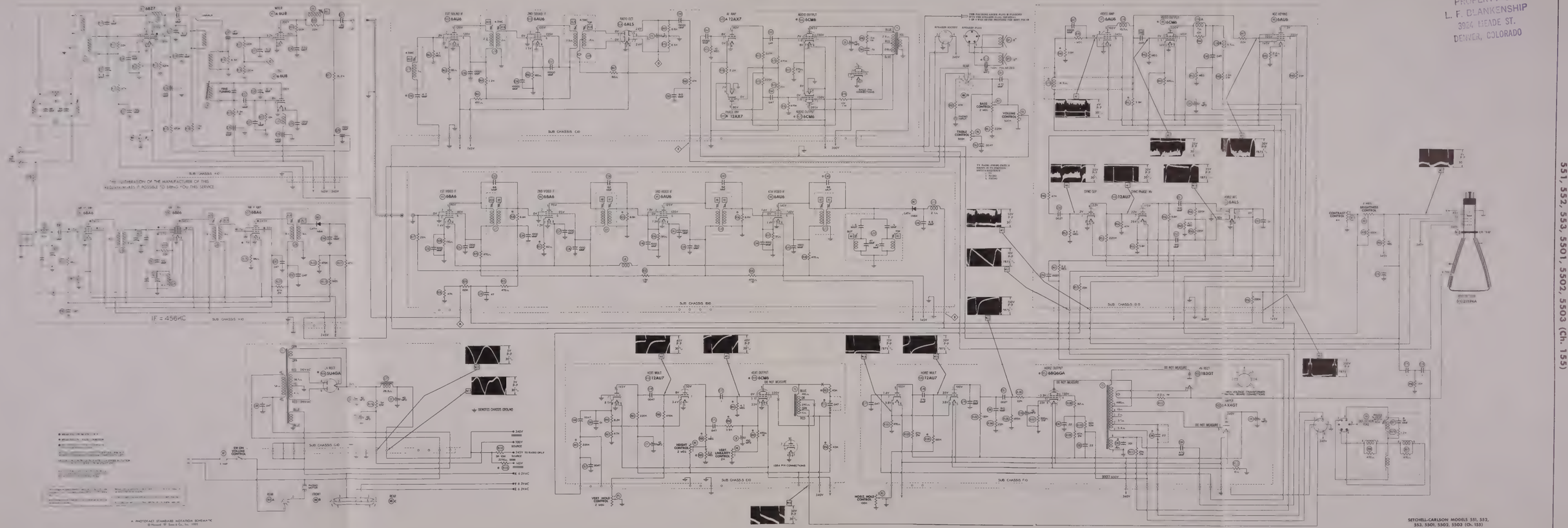

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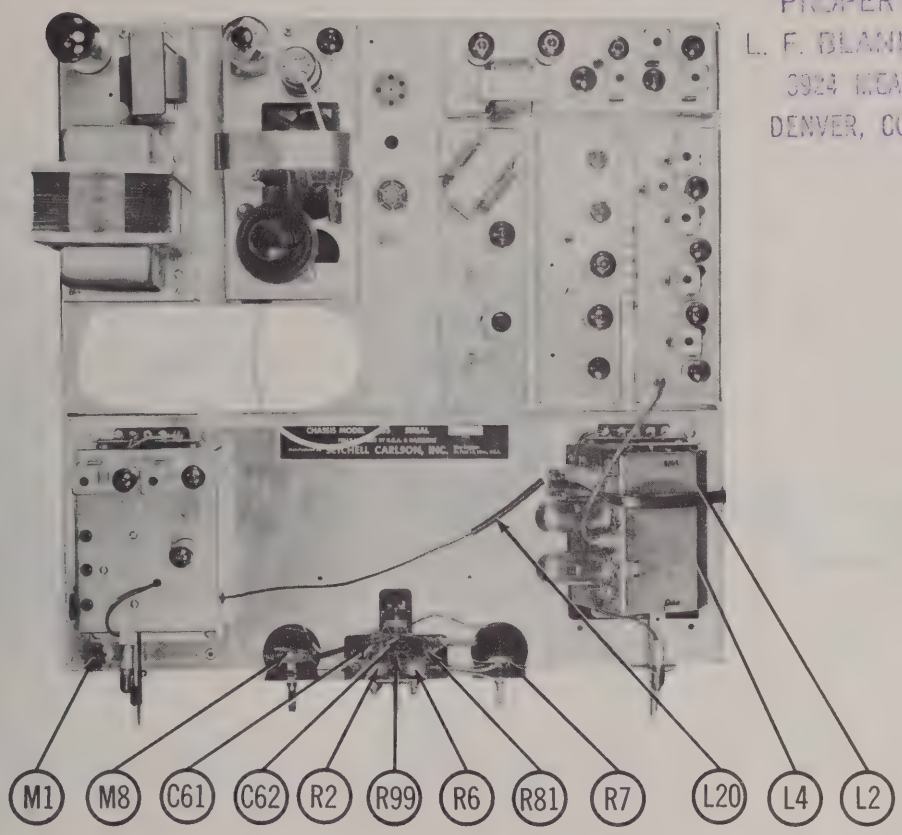
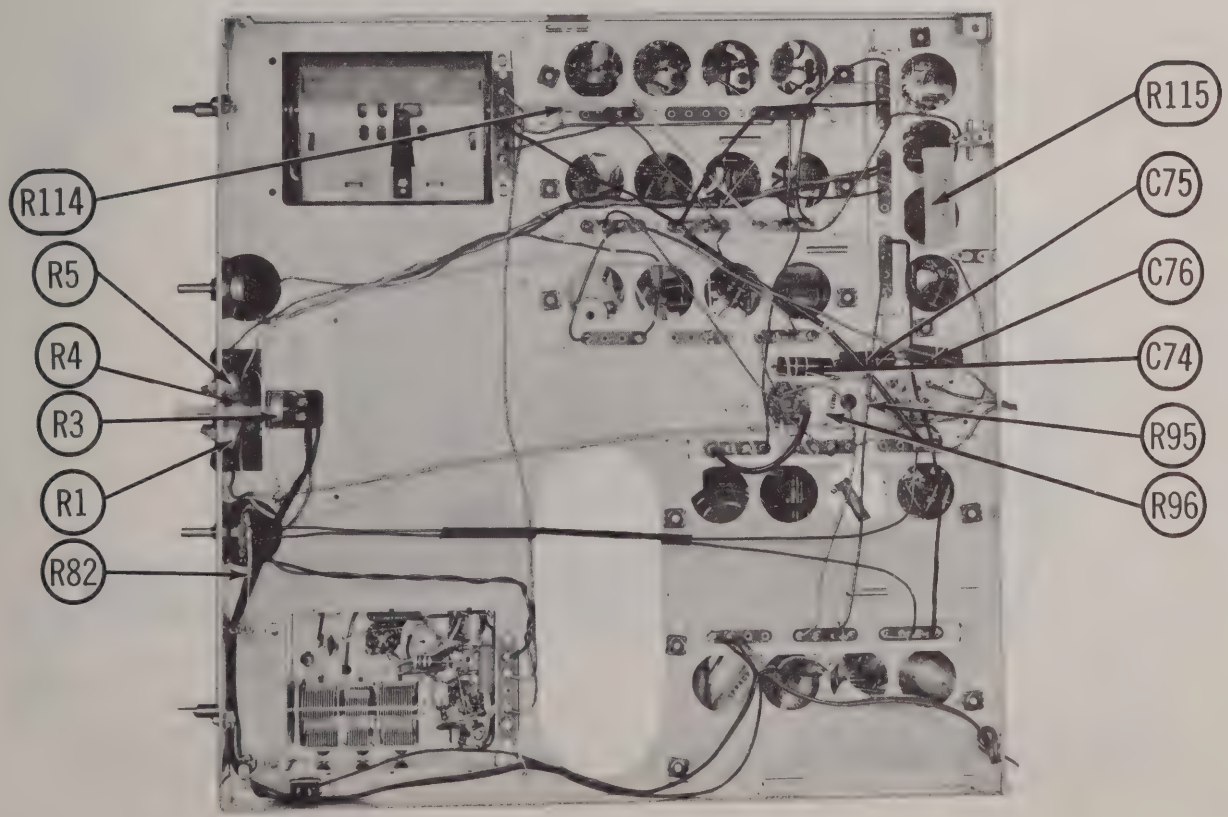
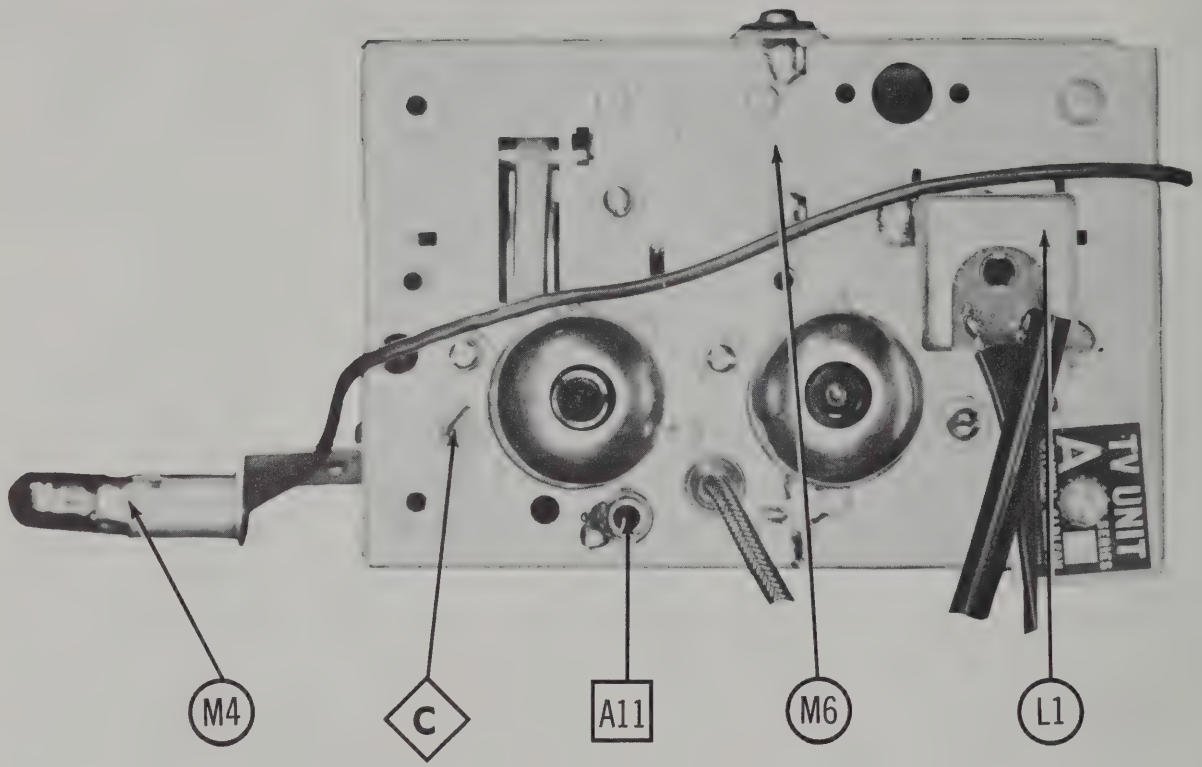


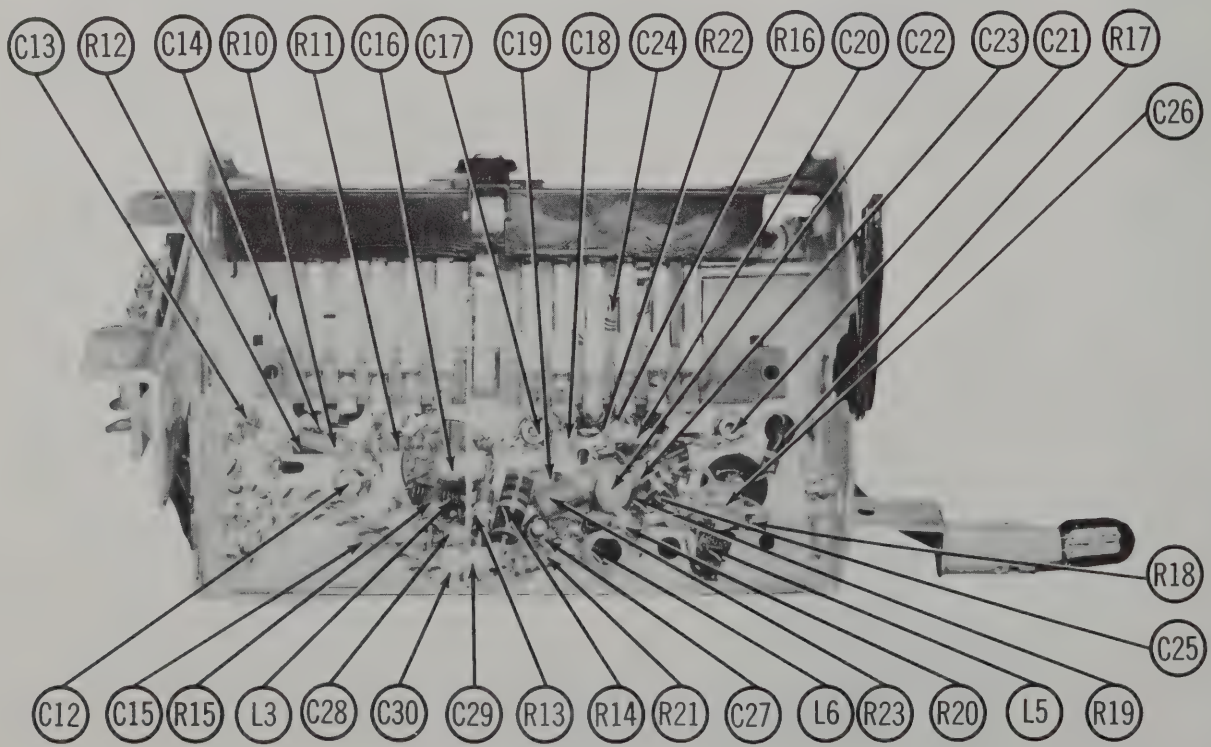
CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW



CHASSIS A TOP VIEW



CHASSIS A BOTTOM VIEW

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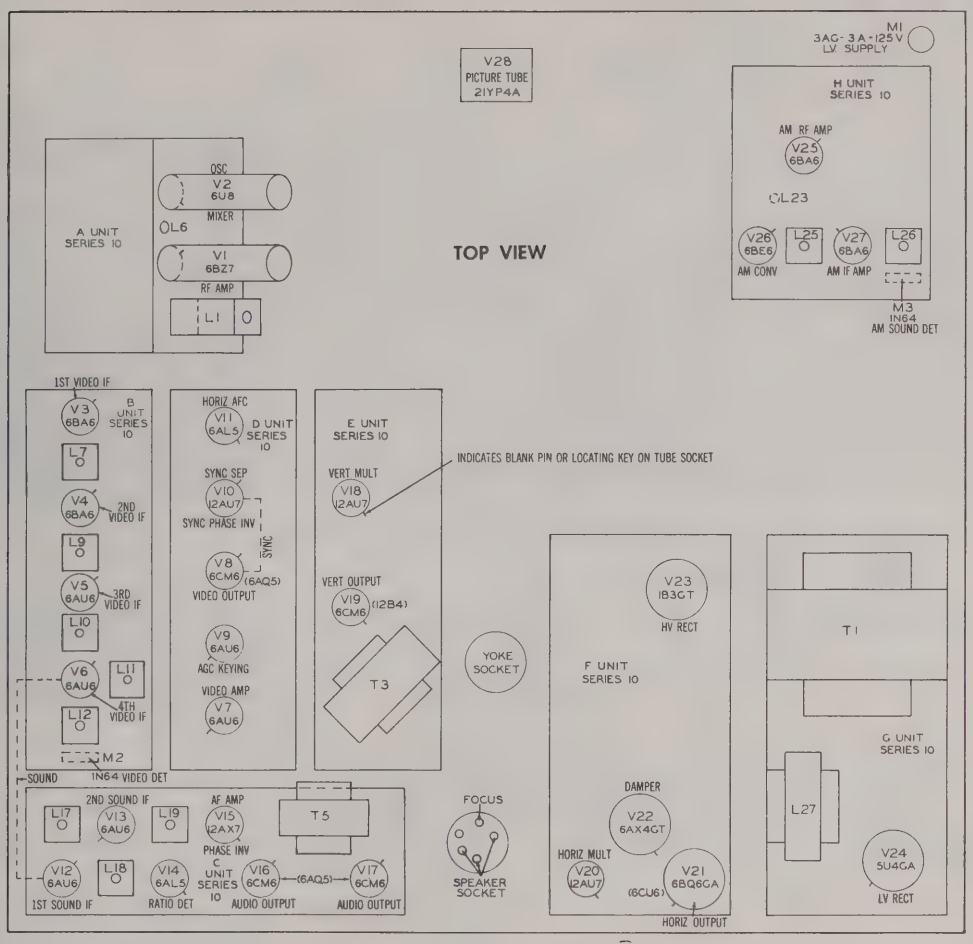
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V24, Fuse (M1)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V7, V8, V9, V28**
Has pic, no sound - **V12, V13, V14, V15, V16, V17**
Overloaded picture - **V9**

SYNC FAILURE
No vert. sync - **V10, V18**
No horiz. sync - **V10, V11, V20**
No vert. or horiz. sync - **V10**

SWEEP FAILURE
No raster, has sound - **V20, V21, V22, V23, V28**
No vertical deflection - **V18, V19**
Poor vert. linearity or foldover - **V18, V19**
Poor horiz. linearity or foldover - **V20, V21, V22**
Narrow picture - **V20, V21, V22, V23, V24**
Vert. off freq. - **V10, V18**
Horiz. off freq. - **V10, V11, V20**

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The horizontal oscillator tube (V20) may be removed during alignment to eliminate the high voltage shock hazard.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) from its socket. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the negative lead of a 8 volt battery to point Ⓐ. Positive lead to chassis.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to pin 1 (grid) of V6. Low side to chassis.	46.5MC (10MC Swp)	48MC 50.25MC 44.25MC	Any	Vert. Amp. to point B thru 10KΩ. Low side to chassis.	A1, A2, A3, A4	Adjust for response curve similar to Fig. 1. Adjust A1 and A2 to place 48MC marker on response curve. Adjust A3 for 50.25MC marker and A4 for 44.25MC marker on response curve.
2.	"	High side to pin 1 (grid) of V5. Low side to chassis.	"	"	"	"	A5, A6	Adjust for response curve similar to Fig. 2.
3.	"	High side to pin 1 (grid) of V4. Low side to chassis.	"	"	"	"	A7, A8	Adjust for response curve similar to Fig. 2.
4.	"	High side to pin 1 (grid) of V3. Low side to chassis.	"	"	"	"	A9, A10	Adjust for response curve similar to Fig. 2. Remove bias voltage and check response curve . Without bias voltage the response curve should be similar to Fig. 2.
5.	"	High side to point Ⓒ. Low side to chassis.	"	50.25MC 44.25MC 48.75MC	"	"	A11	Replace V2 in socket and reconnect bias voltage to same point. Adjust A11 for MINIMUM tilt. Recheck response curve if necessary, retouch slightly A1, A2 and A5 thru A-11 for desired response similar to Fig. 3.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.01MFD	High side to point Ⓑ. Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point Ⓓ. Common to chassis.	A12, A13, A14, A15	Detune A16, by turning core away from center position. Adjust A12 thru A15 for maximum deflection. Attenuate generator output to maintain not more than 3 to 4 volts at VTVM.
7.	.01MFD	"	"	"	DC probe to point Ⓔ. Common to chassis.	A16	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	.01MFD	High side to point Ⓑ. Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point Ⓓ. Low side to chassis.	A12, A13, A14, A15	Disconnect stabilizing capacitor C5. Adjust for curve of maximum amplitude and symmetry (Fig. 4).
7.	.01MFD	"	"	"	"	Vert. Amp. to point Ⓔ. Low side to chassis.	A16	Reconnect stabilizing capacitor C5. Adjust so that 4.5MC occurs at center of cross-over lines as in Fig. 5. SLIGHTLY retouch A15 for maximum amplitude and straightness of crossover lines.

TUNER ALIGNMENT

The tuner portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

RADIO ALIGNMENT

Set "Radio-Phono-TV" switch to "Radio" position.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment hex tool and insulated screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
8.	.01MFD	High side to pin 7 (grid) of 6BE6 (V26). Low side to chassis.	456KC (400%Mod)	AM	Tuning gang fully open	Across voice coil	A17, A18 A19, A20	Adjust for maximum deflection.
9.	"	"	1620KC	"	"	"	A21	"
10.		Loop	1400KC	"	Tune to 1400KC signal	"	A22, A23	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

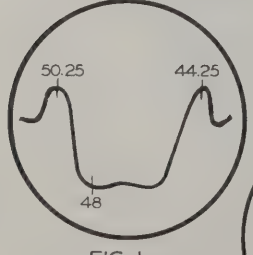


FIG. 1

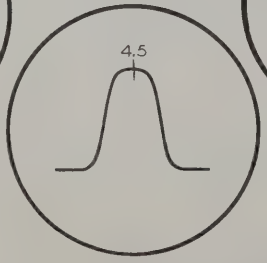


FIG. 4

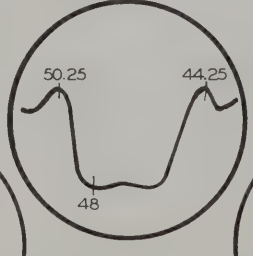


FIG. 2

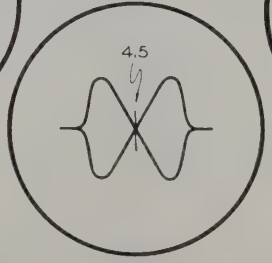


FIG. 5

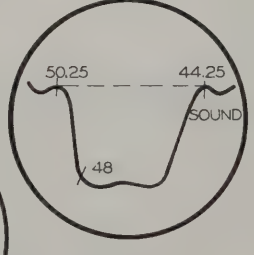


FIG. 3

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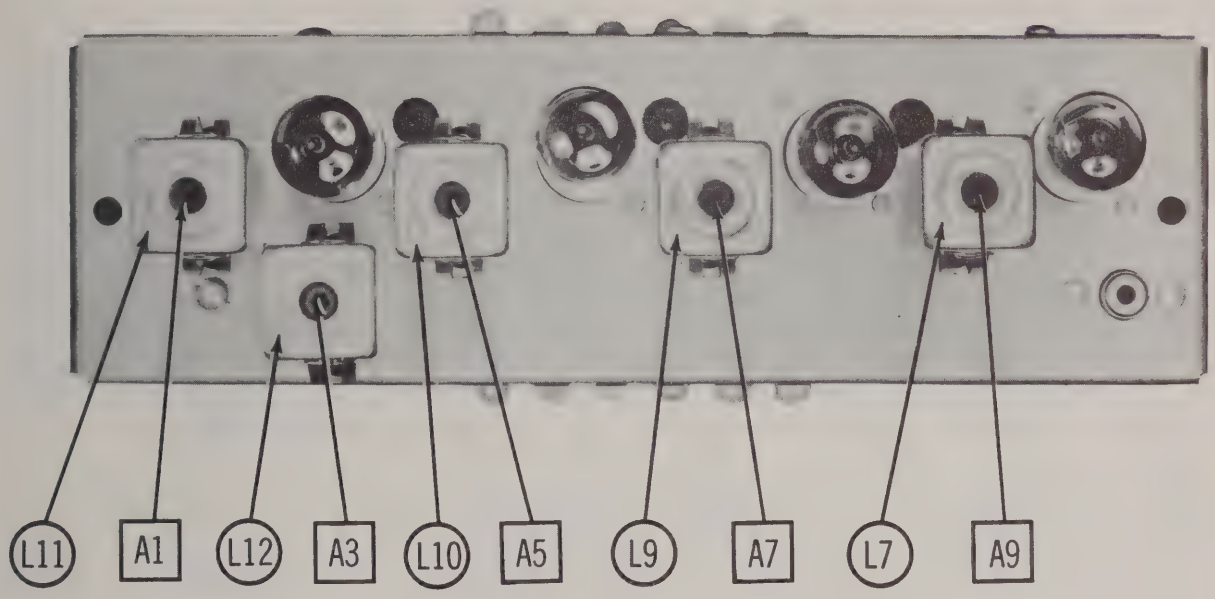
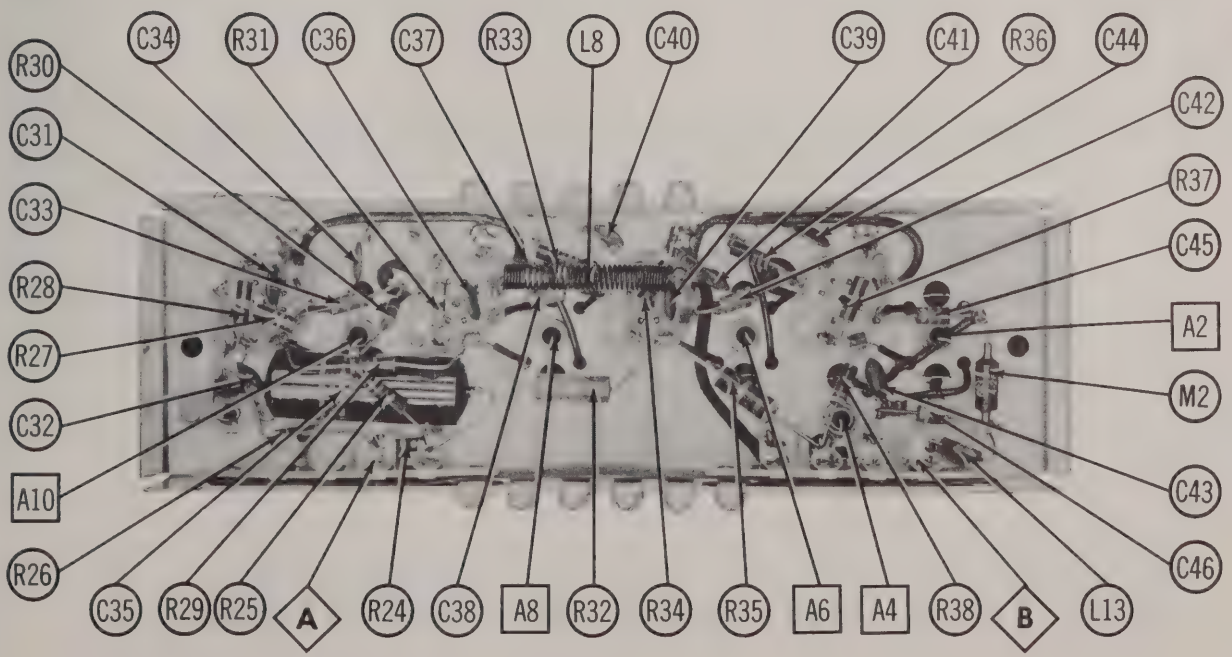


CHASSIS B TOP VIEW



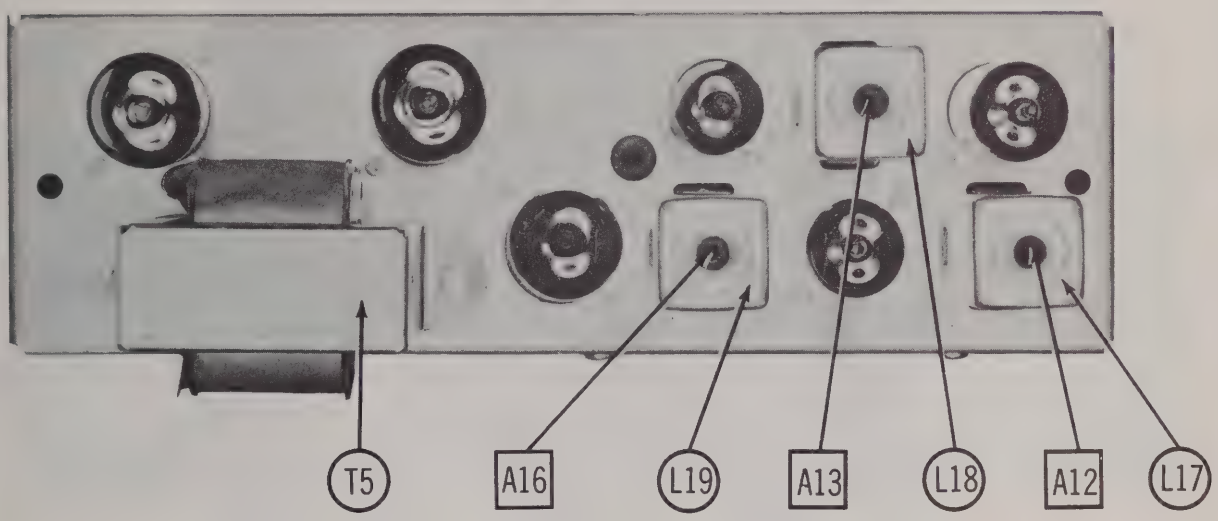
CHASSIS B BOTTOM VIEW

RESISTANCE MEASUREMENTS

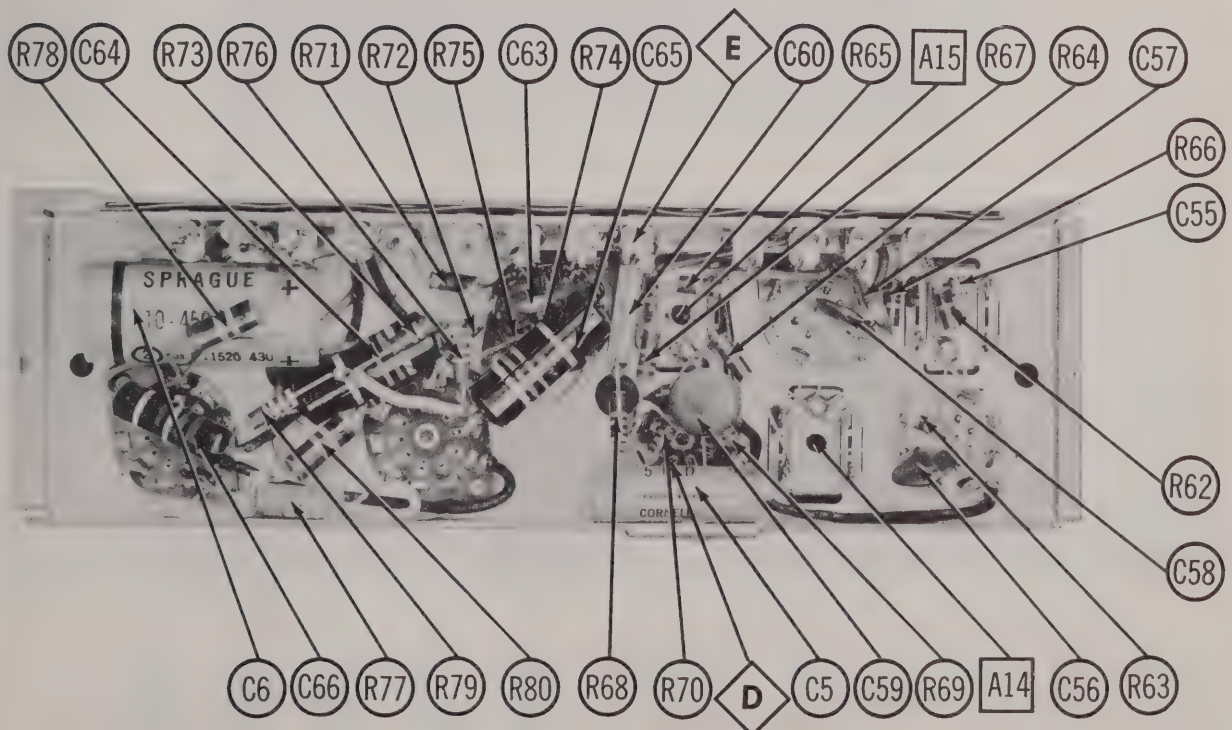
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BZ7	†6.5KΩ	†330KΩ	INF	0Ω	.1Ω	INF	94KΩ	47Ω	0Ω
V 2	6U8	†5.8KΩ	200KΩ	†110KΩ	.1Ω	0Ω	†13KΩ	0Ω	0Ω	10KΩ
V 3	6BA6	170KΩ	0Ω	0Ω	.1Ω	†5KΩ	†5KΩ	150Ω		
V 4	6BA6	150KΩ	0Ω	0Ω	.1Ω	†5KΩ	†5KΩ	82Ω		
V 5	6AU6	0Ω	150Ω	0Ω	.1Ω	†3KΩ	†3KΩ	150Ω		
V 6	6AU6	0Ω	150Ω	0Ω	.1Ω	†3KΩ	†3KΩ	150Ω		
V 7	6AU6	1Meg	0Ω	0Ω	.1Ω	†6.4KΩ	†2.5KΩ	0Ω		
V 8	6CM6	†2.5KΩ	47KΩ	1Meg	.1Ω	0Ω	1Meg	2.2KΩ	INF	†3.3KΩ
V 9	6AU6	†28.5KΩ	†2.5KΩ	.1Ω	0Ω	390KΩ	†22KΩ	†2.5KΩ		
V 10	12AU7	†9.3KΩ	47KΩ	5.6KΩ	.1Ω	.1Ω	†220KΩ	4.7Meg	0Ω	0Ω
V 11	6AL5	27KΩ	27KΩ	0Ω	.1Ω	5Meg	0Ω	5Meg		
V 12	6AU6	4.7Meg	0Ω	0Ω	.1Ω	†4.2KΩ	†4.2KΩ	82Ω		
V 13	6AU6	2Ω	0Ω	0Ω	.1Ω	†3KΩ	†3KΩ	180Ω		
V 14	6AL5	1Meg	1Meg	0Ω	.1Ω	6.8KΩ	0Ω	6.8KΩ		
V 15	12AX7	†230KΩ	10Meg	0Ω	0Ω	0Ω	†230KΩ	15KΩ	2.2KΩ	.1Ω
V 16	6CM6	†11.5KΩ	INF	500KΩ	.1Ω	0Ω	500KΩ	270Ω	INF	†1.7KΩ
V 17	6CM6	†11.5KΩ	INF	500KΩ	.1Ω	0Ω	500KΩ	270Ω	INF	†1.7KΩ
V 18	12AU7	†1.8Meg	1.3Meg	4.7KΩ	0Ω	0Ω	†260KΩ	0Ω	13KΩ	.1Ω
V 19	6CM6	†300Ω	5KΩ	4.7Meg	.1Ω	0Ω	4.7Meg	900Ω	INF	†700Ω
V 20	12AU7	†120KΩ	180KΩ	470Ω	.1Ω	.1Ω	†27KΩ	7Meg	470Ω	0Ω
V 21	6BQ6GA	22KΩ	0Ω	300Ω	†47KΩ	500KΩ	500KΩ	.1Ω	300Ω	Top Cap ▲10Ω
V 22	6AX4GT	†30Ω	INF	170KΩ	INF	†30Ω	INF	.1Ω	0Ω	
V 23	1B3GT		PINS	1 - 8	HAVE	INFINITE	RESISTANCE			Top Cap ▲490Ω
V 24	5U4GA	INF	70KΩ	INF	40Ω	INF	41Ω	70KΩ	70KΩ	
V 25	6BA6	2.5Meg	0Ω	0Ω	.1Ω	†5KΩ	†50KΩ	0Ω		
V 26	6BE6	22KΩ	.4Ω	0Ω	.1Ω	†5KΩ	†50KΩ	1.5Meg		
V 27	6BA6	1.5Meg	0Ω	0Ω	.1Ω	†5KΩ	†50KΩ	68Ω		
V 28	21YP4A	0Ω	1Meg	Pin 6 †30Ω	Pin 10 †30Ω	Pin 11 †350KΩ	Pin 12 .1Ω			

† MEASURED FROM PIN 8 OF V24.
▲ MEASURED FROM PIN 3 OF V22.

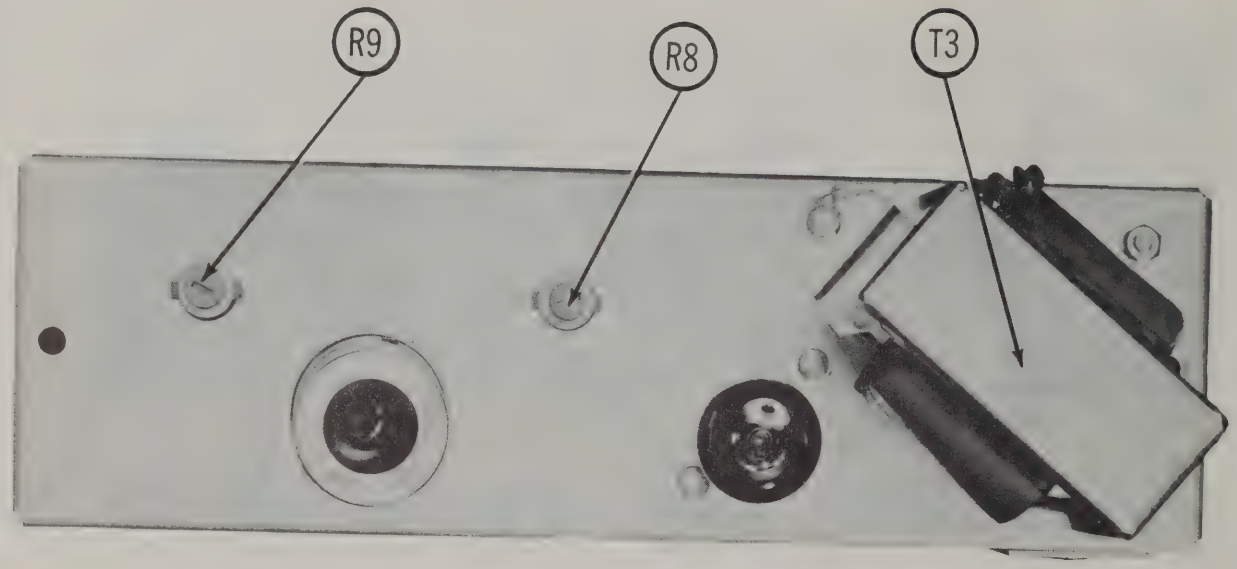
PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



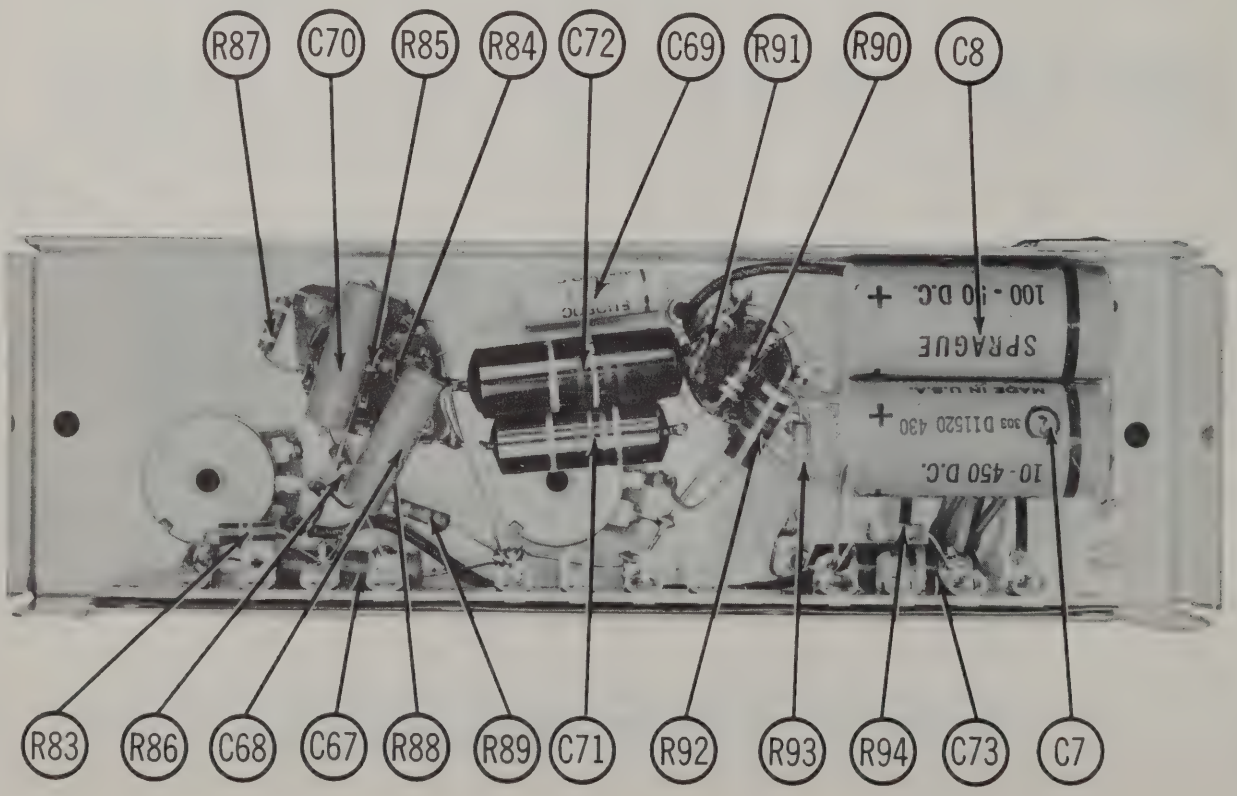
CHASSIS C TOP VIEW



CHASSIS C BOTTOM VIEW

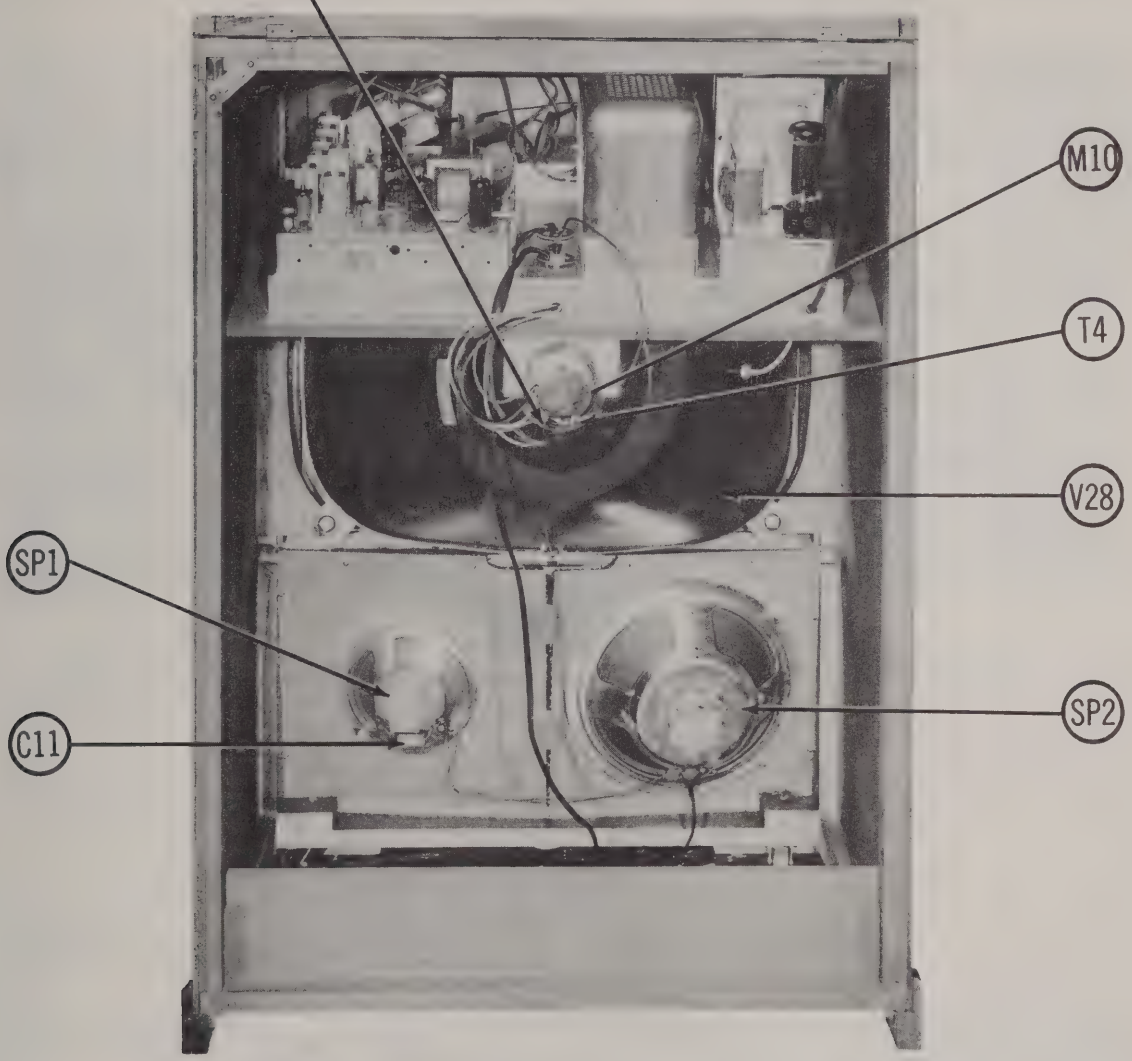


CHASSIS E TOP VIEW



CHASSIS E BOTTOM VIEW

PROPERTY OF
L. E. BLANKENSHIP
3324 MEADE ST.
DENVER, COLORADO



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn set on and tune in a TV station. Adjust the horizontal hold control to synchronize the picture horizontally.

If control must be turned fully clockwise or counter clockwise to sync in picture, or if slow warm-up causes the horizontal frequency to drift, replace V20 (12AU7).

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V21, V22 and V24. Check T2, T4A, C81, C80, R109, R104 and other associated components.

DRIVE LINES

Check by substitution V21 and V22. Check T2, C81, C80, R109, R104, R107 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V21 and V22. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V20, V21 and V22. Check C77 for open. Check R100, R1, C78 and other associated components.

XMAS TREE EFFECT

Check by substitution V20, V21 and V22. Check T2 and T4 for internal arcing. Check C54, C53, C78, C79, R101, R103 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V18 and V19. Check waveform W9.

If Satisfactory	If Unsatisfactory
Check T3, C74, C8, R92, R8 and other associated components.	Check C70, C72, C69, R87, R86, R88, R85, R9 and other associated components.

INSUFFICIENT SWEEP

Check by substitution V18 and V19. Check height and vertical linearity controls for proper operation. Check R88, T3 and other associated components.

COMPRESSED AT BOTTOM

Check by substitution V18 and V19. Check R88, R9, R94, C70, C72 and other associated components.

COMPRESSED AT TOP

Check by substitution V18 and V19. Check R92, R8, R88, R94, C8 and other associated components.

FOLDS

Check by substitution V18 and V19. Check C71, C72, R90, R92, T3 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Substitute V10. Check C50, R56, R53, R55 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Substitute V18. Check C68, C69, R86, R5, R87 and other associated components.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V11 and V18. Check C51, C52, C78, R100, R101, R1 and other associated components.

HORIZONTAL BENDING

Check by substitution V9, V10, V11 and V20. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Check by substitution V7 and V8. Check C48, C49, R45, R41, L14, L15, L16B and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check video IF alignment.

POOR CONTRAST

Check by substitution V7 and V8. Check contrast control. Check L16A, C48, C49, C47, R39, R44, R42 and other associated components.

NEGATIVE PICTURE

Check by substitution V7 and V8. Check picture tube. Check video crystal detector network. Check C45, C48, C49, R44, R43, L16A and other associated components.

SMEAR

Check by substitution V7 and V8. Check L13, L16A, R44, C48, C49 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5, V6, V7 and V8 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V12, V13, V14, V15, V16 and V17. Check stages V15, V16 and V17 using audio signal generator. Apply audio signal across R3.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF stages for component failure or change of value.	Check C63, C64, C65, C66, C6, R72, R75, R78, R80, T5, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A16 for minimum buzz. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

POWER

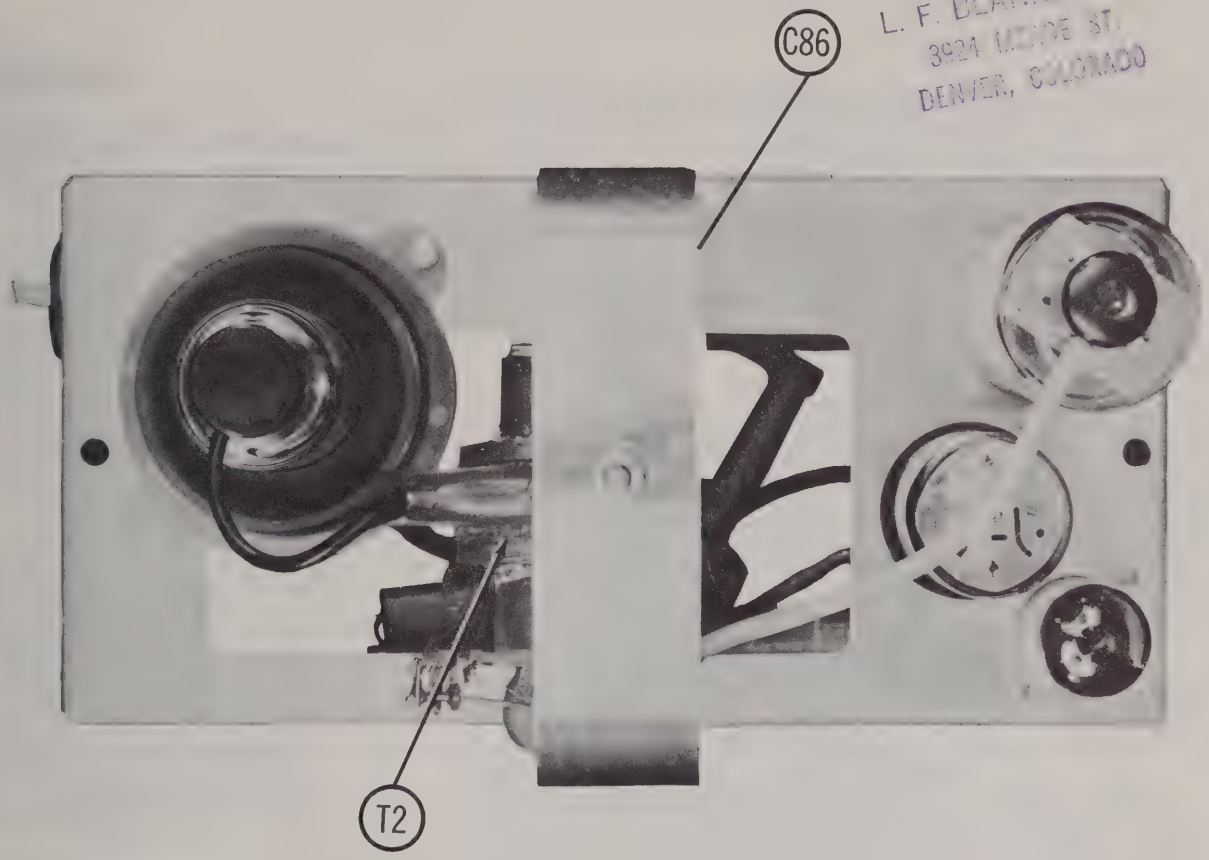
DEAD SET

If filaments fail to light, check M1 fuse. Check AC interlock assembly. Check switch on volume control and T1. Check M8 for TV position. If filaments light, substitute V24. Check B+ filter and decoupling network. Be sure that power unit is tightly secured to chassis.

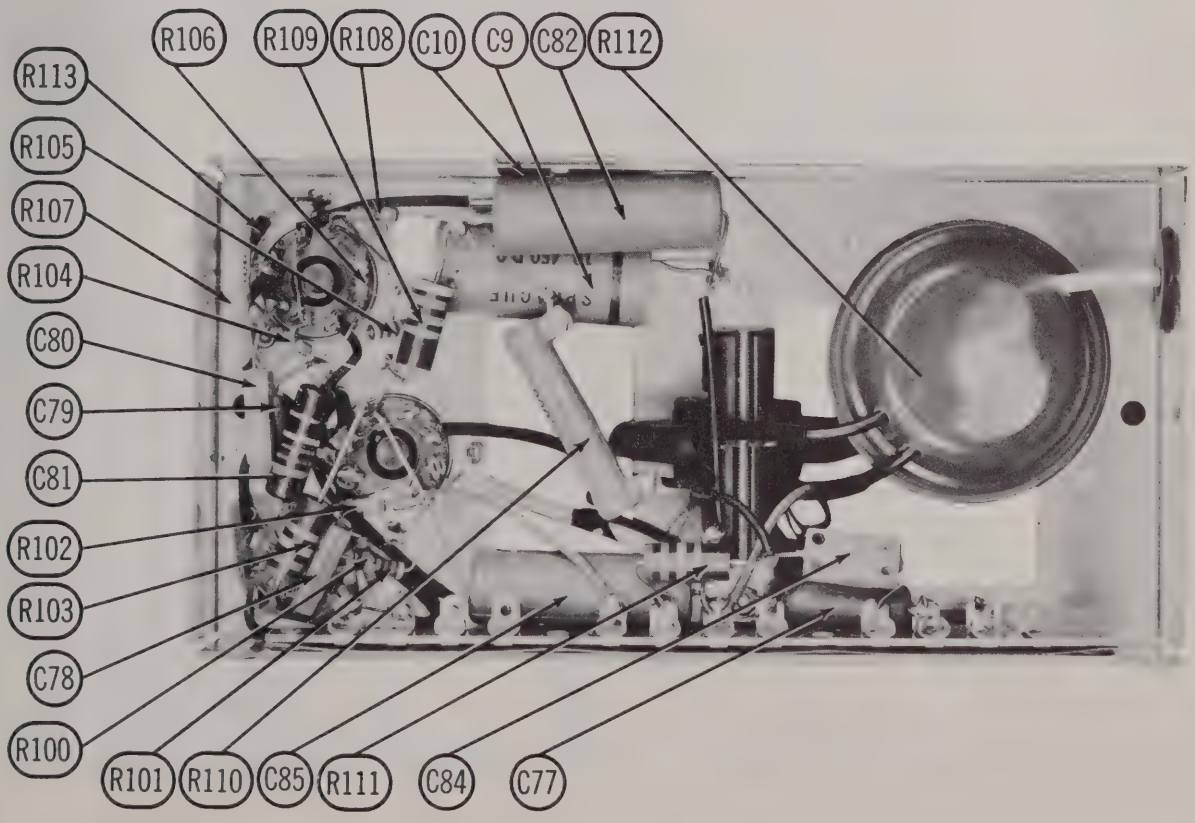
SMALL AND/OR DIM PICTURE

Substitute V24. Check B+ filter and decoupling network.

PROPERTY OF
L. F. BLANKENSHIP
3924 MOORE ST.
DENVER, COLORADO



CHASSIS F TOP VIEW



CHASSIS F BOTTOM VIEW

PROPERTY OF
L. F. BLANKENSHIP.
[illegible] MEADE ST.
[illegible] COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No	USE	REPLACEMENT DATA: Setchell-Carlson PART No.	STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	R.F Amp.	6BZ7	6BZ7	9AJ	
V2	Mixer-Osc.	6U8	6U8	9AK	
V3	1st Video IF Amp.	6BA6	6BA6	7BK	
V4	2nd Video IF Amp.	6BA6	6BA6	7BK	
V5	3rd Video IF Amp.	6AU6	6AU6	7BK	
V6	4th Video IF Amp.	6AU6	6AU6	7BK	
V7	Video Amp.	6AU6	6AU6	7BK	
V8	Video Amp.	6CM6	6CM6	9CK	6AQ6 used as alternate.
V9	AGC Keying	6AU6	6AU6	7BK	
V10	Sync Sep. Sync Amplifier	12AU7	12AU7	9A	
V11	Horiz. AFC	6AL5	6AL5	6BT	
V12	1st Sound IF Amp.	6AU6	6AU6	7BK	
V13	2nd Sound IF Amp.	6AU6	6AU6	7BK	
V14	Ratio Det.	6AL5	6AL5	6BT	
V15	A.F Amp. - Phase inverter	12AX7	12AX7	9A	
V16	Audio Output	6CM6	6CM6	9CK	6AQ6 used as an alternate.
V17	Audio Output	6CM6	6CM6	9CK	6AQ6 used as an alternate.
V18	Vert. Mult.	12AU7	12AU7	9A	
V19	Vert. Output	6CM6	6CM6	9CK	
V20	Horiz. Mult.	12AU7	12AU7	9A	
V21	Horiz. Output	6BQ6GA	6BQ6GA	8AM	6CU6 used as an alternate.
V22	Damper	6AX4GT	6AX4GT	4CG	
V23	HV Rectifier	1B3GT	1B3GT	3C	
V24	LV Rectifier	5U4GA	5U4GA	5T	5U4GB used as an alternate.
V25	AM RF Amp.	6BA6	6BA6	7BK	
V26	AM Conv.	6BE6	6BE6	7CH	
V27	AM IF Amp.	6BA6	6BA6	7BK	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: Setchell-Carlson PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V28	21YP4A ①	21YP4A ① 21YP4	21YP4A ① 21YP4	21YP4A ① 21YP4	21YP4A ① 21YP4	12L 12L	① Aluminized

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	Setchell-Carlson PART No.	REPLACEMENT DATA: CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1	40	450		TC7S	TC-40-450	FM-4540			
C2	40	450		TC7S	TC-40-450	FM-4540			
C3	40	450		TC7S	TC-40-450	FM-4540			
C4	10	450		TC7S	TC-10-450	FM-4510			
C5	5	150		TC40	TC-4-150	MMT-1505			
C6	10	450		TC7S	TC-10-450	FM-4510			
C7	10	450		TC7S	TC-10-450	FM-4510			
C8	100	50		TC350	TC-100-50	MTH-5010			
C9	10	450		TC7S	TC-10-450	FM-4510			
C10	10	25		TC22	TC-10-25	MMT-0510			
C11	50	12				MTH-1210			Note 1
C12	3-9		839-10						
C13	1000		DD-103	801-001		DC-521			
C14	1000		DD-103	801-001		DC-521			
C15	3		TCZ-3	MP6K-030		ZT-5533			
C16	1000								
C17	.5-3		839-3	3115-01-0R5		CT65A			
C18	47		DS-470	831-470					
C19	1.5		TCZ-1.5	MP6K-IR5					
C20	47								
C21	.5-3		839-3	3115-01-0R5		CT65A			
C22	10		TCN-10	N750K-100		MT-541			
C23	5								
C24	.5-3		839-3	3115-01-0R5		CT65A			
C25	1000		DD-103	801-001		DC-521			
C26	330		DS-331	811-331		UC-5322			
C27	130		DS-131	811-131		UC-5312			
C28	1000								
C29	1000								
C30	1000								
C31	1000		DD-103	801-001		DC-521		K-1210	
C32	1000		DD-102	801-001		DC-521		K-1210	
C33	.68								Note 2
C34	1000	200	DD-103	801-001		DC-521		K-1210	
C35	.47				IMP2-D47	PT6S47	IMP2-D47	3302047	
C36	1000		DD-103	801-001		DC-521		K-1210	
C37	1000		DD-102	801-001		DC-521		K-1210	
C38	33								
C39	1000		DD-102	801-001		DC-521		K-1210	
C40	1000		DD-102	801-001		DC-521		K-1210	
C41	1000		DD-102	801-001		DC-521		K-1210	
C42	.33								
C43	1000		DD-102	801-001		DC-521		K-1210	
C44	1000		DD-102	801-001		DC-521		K-1210	
C45	.68								Note 2
C46	6.8		TCZ-6.8	MP6K-6R8		ZT-5568			
C47	10000		DD-103	831-01		DC-511			
C48	.047	400	DF-503		IMP4-S47	PT4S47	IMP4-S47	3304147	
C49	.047	400	DF-503			PT4S47	IMP4-S47	3304147	
C50	.0027	400						3306227	
C51	910							KM-1391	
C52	910							KM-1391	
C53	.01	400	DS-103	GP2-S33-103		PT4S1	IMP4-S1	3304127	
C54	.0027	400						3306227	
C55	4.7		TCZ-4.7	MP6K-050		ZT-555			Note 3
C56	10000		DD-103	831-01		DC-511			

Note 1. Non-polarized unit.
Note 2. Some versions use .82MMF in this application.
Note 3. Some versions use 6.8MMF in this application.
Note 4. Not used in some versions.
Note 5. Some versions use 47MMF in this application. 27" models use 75MMF in this application.
* Connect negative leads together.

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING: CAP.	VOLT	Setchell-Carlson PART No.	REPLACEMENT DATA: CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C57	10000			DD-103	811-01	DC-511			
C58	10000			DD-103	811-01	DC-511			
C59	10000			DD-103	811-01	DC-511			
C60	910	500						KM-1391	
C61	470	500		D6-471	GP2K-471	MC345		K-1347	
C62	.0047	400		D6-472	GP2-S33-473	PT6347	IMP6-D47	3306347	
C63	10000			DD-103	811-01	DC-511			
C64	.047	400		DF-503		PT4147	IMP4-S47	3304147	
C65	.047	400		DF-503		PT4147	IMP4-S47	3304147	
C66	.01	400		D6-104	GP2-S33-103	PT4S1	IMP4-S1	330401	
C67	.0047	400		D6-472	GP2-S33-473	PT6347	IMP6-D47	3306347	
C68	.0047	400		D6-472	GP2-S33-473	PT6347	IMP6-D47	3306347	
C69	.01	400		D6-103	GP2-S33-103	PT4S1	IMP4-S1	330401	
C70	.0047	400		D6-472	GP2-S33-472	PT6347	IMP6-D47	3306347	
C71	.047	400		DF-503		PT4S47	IMP4-S47	3304147	
C72	.1	400		DF-104		PT4S1	IMP4-P1	330401	
C73	.047	400		DF-503		PT4147	IMP4-S47	3304147	Note 4
C74	.1	400		DF-104		PT4S1	IMP4-P1	330401	
C75	.1	400		DF-104		PT4S1	IMP4-P1	330401	
C76	.1	400		DF-104		PT4S1	IMP4-P1	330401	
C77	.047	400		DF-503		PT4147	IMP4-S47	3304147	
C78	270	500				MC2E241		KM-1327	
C79	270	500				MC2E241		KM-1327	
C80	910	500						KM-1391	
C81	.0027	400						3306227	
C82	.22	400				PT4S22	IMP4-P22	3304022	
C83	.001	1000		DD15-103	1R5KV-102	PT2S31	CT15-101	31J5-001	Note 4
C84	470	1000		DD15-471	1R5KV-471	MCL347		K-3347	
C85	.22	400				PT4S22	IMP4-P22	3304022	
C86	.22	400				PT4S22	IMP4-P22	3304022	Note 4
C87	56	3000		DD30-560	3KV-560				Note 5
C88	.047	400		DF-503		PT4147	IMP4-S47	3304147	
C89	100			D6-101	801-101	UC-531		K-1310	
C90	.047	400		DF-503		PT4147	IMP4-S47	3304147	
C91	100			D6-101	801-101	UC-531		K-1310	
C92	.047	400		DF-503		PT4147	IMP4-S47	3304147	
C93	.047	400		DF-503		PT4147	IMP4-S47	3304147	
C94	100			D6-101	801-101	UC-531		K-1310	

CONTROLS

ITEM No.	RATING: RESIST.	WATTS	Setchell-Carlson PART No.	REPLACEMENT DATA: IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	100KΩ	½	803	QU-138	A47-100K-S	BX-40	BU-41	Horiz. Hold
B	Shaft		Not Req.	8Q	FS3-1/4	Not Req.	Not Req.	Attach to R1A
R2A	3Meg	½	808	QU-139	A47-3Meg-S	BX-75	BU-56	Base
B	Shaft		Not Req.	8Q	FS2-1/4	Not Req.	Not Req.	Attach to R2A
R3A	500KΩ	½	806	QU3-133	A47-500K-Z	B-80-S	U-48	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R3A
C	Switch		Not Req.	T6-1	SWE-13	Not Req.	U8-38	Attach to R3A
R4A	3Meg	½	803	QU-139	A47-3Meg-S	BX-75	BU-56	Brightness
B	Shaft		Not Req.	8Q	FS2-1/4	Not Req.	Not Req.	Attach to R4A
R5A	3Meg	½	803	QU-139	A47-3Meg-S	BX-75	BU-56	Vert. Hold
B	Shaft		Not Req.	8Q	FS2-1/4	Not Req.	Not Req.	Attach to R5A
R6A	500KΩ	½	804	QU3-135	A47-500K-Z	AB-80	U-48	Treble
B	Shaft		Not Req.	Not Req.	FS2-1/4	AK-1	Not Req.	Attach to R6A
R7A	400KΩ	½	805	QU7-113	A47-400K-S	AB-13	U-14	Contrast
B	Shaft		Not Req.	Not Req.	FS-3	AK-3	Not Req.	Attach to R7A
R8A	200KΩ	½	801	QU7-131		AB-705	U-7	Vert. Linearity
B	Shaft		Not Req.	8Q		AK-1	Not Req.	Attach to R8A
R9A	3Meg	½	803	QU-139	A47-3Meg-S	BX-75	BU-56	Height
B	Shaft		Not Req.	8Q		Not Req.	Not Req.	Attach to R9A

RESISTORS

ITEM No.	RATING: OHMS	WATT	Setchell-Carlson PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R10	47KΩ	½		BTS-47K	
R11	22KΩ	½		BTS-22K	
R12	47Ω	½		BTS-47	
R13	820KΩ	½		BTS-820K	
R14	1500Ω	½		BTA-1500	
R15	470KΩ	½		BTS-470K	
R16	680ΩΩ	½		BTS-680Ω	
R17	100KΩ	½		BTS-100K	
R18	100KΩ	½		BTS-100K	
R19	100KΩ	½		BTS-100K	
R20	22KΩ	½		BTS-22K	
R21	820ΩΩ	½		BTS-820Ω	
R22	10KΩ	½		BTS-10K	
R23	3300Ω	½		BTA-3300	
R24	100KΩ	½		BTS-100K	
R25	470Ω	½		BTS-470	
R26	47KΩ	½		BTS-47K	
R27	22KΩ	½		BTS-22K	
R28	150Ω	½		BTS-150	
R29	470Ω	½		BTS-470	
R30	6800Ω	½		BTS-6800	Note 11
R31	82Ω	½		BTS-82	Note 1
R32	1500Ω 5%	1		BTA-1500 5%	
R33	6800Ω	½		BTS-6800	Note 11
R34	150Ω	½		BTS-150	
R35	470Ω	1		BTA-470	
R36	6800Ω	½		BTS-6800	Note 11
R37	150Ω	½		BTS-150	

ITEM No.	RATING: OHMS	WATT	Setchell-Carlson PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R38	470Ω	½		BTS-470	
R39	1Meg	½		BTS-1Meg	
R40	3900Ω	½		BTS-3900	Note 2
R41	3900Ω	½		BTS-3900	Note 3
R42	1Meg	½		BTS-1Meg	
R43	470Ω	½		BTS-470	
R44	10KΩ	½		BTS-10K	
R45	3300Ω	½		BTS-3300	
R46	47KΩ	½		BTS-47K	
R47	22KΩ	½		BTS-22K	
R48	22KΩ	½		BTS-22K	
R49	2.2Ω	1			
R50	220KΩ	½		BTS-220K	
R51	1Meg	½		BTS-1Meg	
R53	4.7Meg	½		BTS-4.7Meg	
R53	220KΩ	½		BTS-220K	
R54	47KΩ	½		BTS-47K	
R55	5600Ω	½		BTS-5600	
R56	6800Ω	½		BTS-6800	
R57	22KΩ	½		BTS-22K	
R58	220KΩ	½		BTS-220K	
R59	220KΩ	½		BTS-220K	
R60	4.7Meg	½		BTS-4.7Meg	
R61	2.2Meg	½		BTS-2.2Meg	
R62	4.7Meg	½		BTS-4.7Meg	
R63	82Ω	½		BTS-82	
R64	1200Ω	½		BTS-1200	
R65	470Ω	½		BTS-470	

RESISTORS (cont)

ITEM No	RATING: OHMS	WATT	Setchell-Carlson PART No	REPLACEMENT DATA: IRC PART No	NOTES
R66	180Ω	½		BTS-180	
R67	180Ω	½		BTS-180	
R68	47KΩ	½		BTS-47K	
R69	6800Ω	½		BTS-6800	
R70	6800Ω	½		BTS-6800	
R71	10Meg	½		BTS-10Meg	
R72	330KΩ	½		BTS-330K	
R73	15KΩ	½		BTS-15K	
R74	220ΩΩ	½		BTS-220Ω	
R75	220KΩ	½		BTS-220K	
R76	470KΩ	½		BTS-470K	
R77	270Ω	1		BTA-270	
R78	10KΩ	½		BTA-10K	
R79	470KΩ	½		BTS-470K	
R80	10KΩ	½		BTA-10K	
R81	220KΩ	½		BTS-220K	
R82	47KΩ	½		BTS-47K	
R83	220KΩ	½		BTS-220K	Note 12
R84	8200Ω	½		BTS-8200	
R85	220KΩ	½		BTS-220K	
R86	470KΩ	½		BTS-470K	
R87	47KΩ	½		BTS-47K	
R88	1Meg	½		BTS-1Meg	Note 4
R89	2.2Meg	½		BTS-2.2Meg	Note 5
R90	3900Ω	½		BTS-3900	Note 6
R91	4.7Meg	½		BTS-4.7Meg	Note 13
R92	470Ω	½		BTA-470	Note 7
R93	43KΩ 5%	½		BTS-43K 5%	Note 5 & 14
R94	43KΩ 5%	½		BTS-43K 5%	Note 8
R95	10Meg	½		BTS-10Meg	

ITEM No	RATING: OHMS	WATT	Setchell-Carlson PART No	REPLACEMENT DATA: IRC PART No	NOTES
R96	10KΩ	½		BTS-10K	
R97	470Ω	½		BTS-470	
R98	470Ω	½		BTS-470	
R99	100KΩ	½		BTS-100K	
R100	100KΩ	½		BTS-100K	Note 9
R101	470Ω	½		BTS-470	
R102	120KΩ	½		BTS-120K	
R103	27KΩ	2		BTB-27K	
R104	22KΩ	½		BTS-22K	
R105	470KΩ	½		BTS-470K	
R106	22KΩ	½		BTS-22K	
R107	300Ω	5		PWV-300	
R108	82Ω	½		BTS-82	
R109	47KΩ	2		BTB-47K	
R110	50KΩ	10		BTJ-50K	
R111	27KΩ	2		BTB-27K	
R112	22Ω	1			
R113	10Ω	½		BTS-10	
R114	5000Ω	10		PW10-5000	
R115	2250Ω	20			Note 10
R116	1500Ω	10		PW10-1500	
R117	1Meg	½		BTS-1Meg	
R118	22KΩ	½		BTS-22K	
R119	1Meg	½		BTS-1Meg	
R120	68Ω	½		BTS-68	
R121	47KΩ	½		BTS-47K	
R122	470KΩ	1		BTS-470K	
R123	47KΩ	2		BTB-47K	
R124	1200Ω	½		BTS-1200	

Note 1: Some versions use a 150Ω resistor in this application.
Note 2: Some versions use a 3000Ω resistor in this application.
Note 3: Some versions use a 2200Ω resistor in this application.
Note 4: Some versions use a 470KΩ resistor in this application.
Note 5: Not used in some versions.
Note 6: Some versions use a 8200Ω resistor in this application.
Note 7: Some versions use a 100ΩΩ resistor in this application.
Note 8: Some versions use a 47KΩ resistor in this application.
Note 9: Some versions use a 120KΩ resistor in this application.
Note 10: Some versions use a 2500Ω 30 watt resistor in this application.
Note 11: Some versions use a 4700Ω resistor in this application.
Note 12: Some versions use a 100KΩ resistor in this application.
Note 13: Some versions use a 2Meg resistor in this application.
Note 14: Some versions when using a 1B4 tube may use a 47KΩ resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING	REPLACEMENT DATA: Setchell-Carlson PART No	Stancor PART No	Merit PART No	Triad PART No	RCA TYPE No	Hallicrafters PART No	Thordarson PART No
T1	PRI: 117VAC @1.7A SEC. 1: 650VCT @180ADC SEC. 2: 5VAC @3A SEC. 3: 6.3VAC @9.2A SEC. 4: 6.3VAC @3A	31P6	P-6470	MP-6470	VPB-48	TS-6X	32B87	T-6470

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: Setchell-Carlson PART No.	Hallderson PART No	Merit PART No	RCA TYPE No.	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No
T2	Horiz. Output Trans.	HF10							
T3	Vert. Output Trans.	MT37							
T4A	Yoke-Horiz. (50MΩ)	FA53-102	DF60K①	MDF-70 ②①	306D1 ①②	Y7DF10/43 ①②	DY-2A ① ②	Y-61 ①②	Y-6 ①②
B	Vert. (27MΩ)		④	②②		③			

① Use original yoke damping network if necessary.
② Use original yoke cover and positioning device.
③ Use original yoke damping network.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI	SEC	Setchell-Carlson PART No.	REPLACEMENT DATA: Stancor PART No.	Merit PART No.	Triad PART No.	Hallderson PART No.	Thordarson PART No.	NOTES
T5	8.6KΩ CT	8Ω CT		A-3852 ①	A-3901 ①	S-55X	E1010	32S87	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP	Setchell-Carlson PART No	REPLACEMENT DATA: VIKING PART No.	QUAM PART No.	NOTES
SP1	6"	PM	3.4Ω		626	6A1	
SP2	10"	PM	2.8Ω		1071J	10A31	

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	SEC.	Setchell-Carlson PART No.	REPLACEMENT DATA: MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Trans.	0Ω	0Ω					
L2	Ant. Coils	0Ω CT	0Ω					
L3	Neutr. Coil	0Ω						
L4	R.F. Mixer Grid & Osc. Coils	0Ω						
L5	Fil. Choke	0Ω						
L6	1st. Video IF	1Ω						
L7	2nd. Video IF	0Ω	0Ω	B300	IT-6531 *		6233 *	1.8 Microhenries
L8	Fil. Choke	0Ω			1D-1001		4604	

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	Setchell-Carlson PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L9	3rd. Video IF	0Ω	0Ω	B200	17-4531 *		6233 *	
L10	4th. Video IF	0Ω	0Ω	B200	17-4531 *		6233 *	
L11	5th. Video IF	0Ω	0Ω	B200	17-4531 *		6233 *	
L12	Video IF Trap Assembly			B201				
L13	Series Peaking Coil	2.1Ω		B202	19-1005		4612	12 Microhenries
L14	Series Peaking Coil	10.5Ω		D201	19-3300		6155	300 Microhenries
L15	Shunt Peaking Coil	14.5Ω		D200	19-3250	TV-185	6154	225 Microhenries, used as series peaking coil in some versions
L16A	Series Peaking Coil	7Ω		D2200	19-3250	TV-185	6154	210 Microhenries
B	Shunt Peaking Coil	8.5Ω		D2200	19-3160		6153	145 Microhenries
L17	1st. Sound IF	7Ω		C-4501A	16-3445 ■	TV-113 ■	6203 ■	
L18	2nd. Sound IF	2.2Ω	2Ω	C-4502 A	16-3445	TV-113	6203	
L19	Ratio Det.	7.5Ω	1.4Ω CT	C-4503	17-3497	TV-115	6205	Tertiary winding -.7Ω
L20	AM Ant. Loading Coil	.2Ω			19-1002		4606	3 Microhenries
L21	Loop Ant.	0Ω						
L22	Ant. Coupling Coil	10Ω		D204	19-3180	TV-184	6154	200 Microhenries
L23	AM RF Coil	80Ω	6.3Ω	449-B	14-1026 ▲	BC-380 ▲	72A ▲	
L24	AM Osc. Coil	5Ω		416-C	14-1060 ♦	BC-381 ◓	71-OSC †	Tapped @ .4Ω
L25	AM Input IF	19Ω	19Ω		16-6758	BC-352	12-C1	
L26	AM Output IF	19Ω	19Ω		16-6758	BC-353	12-C2	

* Detune trap winding.
■ Use one winding only.
▲ Drill mounting hole.
♦ Use primary winding.
◓ Drill mounting hole and use secondary winding.
† Drill mounting hole and use primary winding.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	Setchell-Carlson PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L27	.180ADC	26.8Ω	1.2 Hy.		C-2327①		C-21X	C5040 ①	26C44

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Setchell-Carlson PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	3A 125V			313.003 (3AG-3A-125V)	342003	AGC3	HKP

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		Setchell-Carlson PART No.	SYLVANIA PART No.		
M2	1N64		1N60 or 1N132		Video Det.
M3	1N64		1N60 or 1N132		AM Sound Det.

MISCELLANEOUS

ITEM No.	PART NAME	Setchell-Carlson PART No.	NOTES
M4	Dial Light		VHF Indicator
M5	Dial Light		Radio Indicator
M6	Tuner	TV-6515	VHF
M7	Tuning Cap.	H-201	3 Gang (30-510MMF; 30-475MMF; 30-195MMF)
	Trap		VHF Antenna Input Filter
M8	Switch		TV-Radio-Phono (Wafer Type)
M9	Centering Device		Part of Yoke T4.
M10	Ion Trap		

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
F. BLANKENSHIP.
3224 MEADE ST.
COLORADO

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V20, V21, V22 and V23. Check waveform W16.

If Satisfactory	If Unsatisfactory
Check T2, T4A, C85, C84, C82, C83, C9, R109, R107 and other associated components.	Check C78, C79, C81, R103, R102, R101 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V21, V22 and V24. Check C81, C10, C80, R104, R109, R107 and other associated components.

BLOOMING

Check by substitution V21, V22, V23 and V24. Check R109, C81 and other associated components.

GENERAL

NOTE Check all individual units to see that all units are secured tightly to chassis.

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5, V6, V7, V8 and V9. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

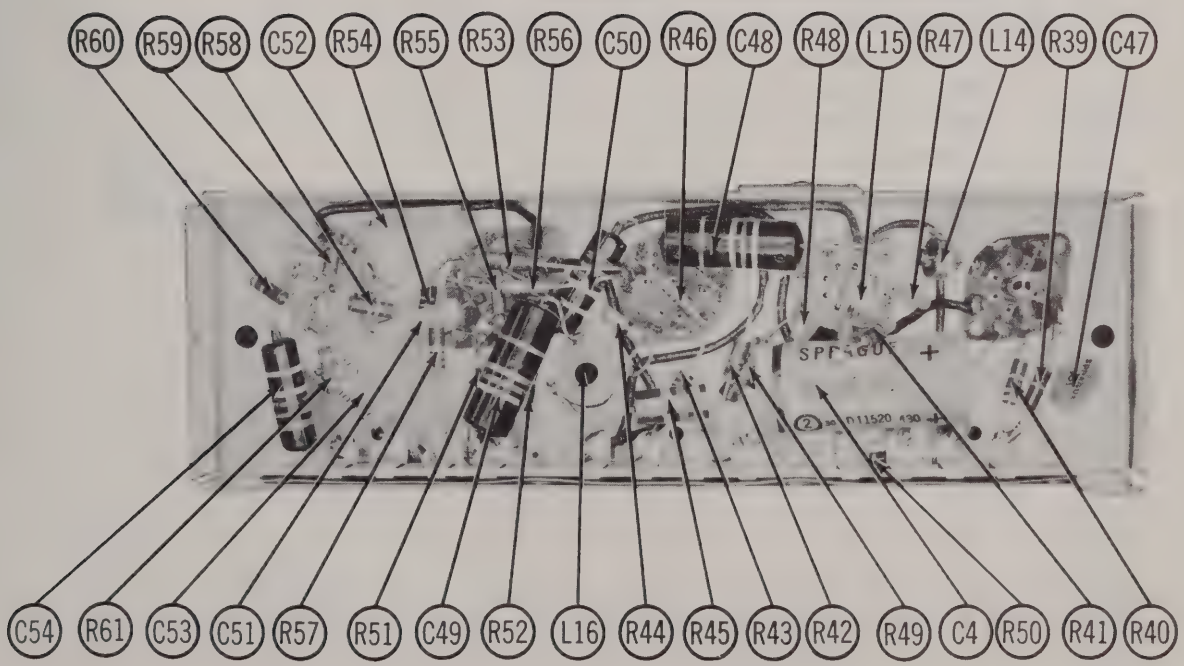
KEYSTONE EFFECT

Check T4 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



CHASSIS D BOTTOM VIEW

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the cabinet to the right of the channel selector knob.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 3 wood screws holding wood strip at the top of safety glass. Remove wood strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

Disconnect picture tube socket, HV lead and deflection yoke socket. Remove 4 front mounting bolts. (Hold tube while removing bolts). Remove picture tube.

SERVICE ADJUSTMENT LOCATION

Adjustment of the brightness and the horizontal and vertical hold controls, it is necessary to remove the on/off volume control knob. Adjustments are accessible only when this knob is removed.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjust the horizontal hold control to synchronize the picture horizontally. If the horizontal hold control will not synchronize the picture, replace V20 (12AU7).

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L19) located on top of chassis. (See tube placement chart).

FUSES

One fuse is used for LV power supply protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

TO SERVICE TUBES AND SUB-CHASSIS

Remove 2 wood screws located on the front underside of the cabinet top, then lift top.

REMOVAL OF MAIN CHASSIS

1. Remove 9 push-on type control knobs from front panel of cabinet.
2. Remove 14 wood screws from rear cover. Remove rear cover.
3. Remove picture tube socket, focus and speaker plugs and HV lead.
4. Remove 2 screws from antenna bracket.
5. Remove 2 chassis bolts. Remove chassis.

SPEAKER REMOVAL

1. Remove 6 speaker nuts from 2 speakers. Remove speakers.

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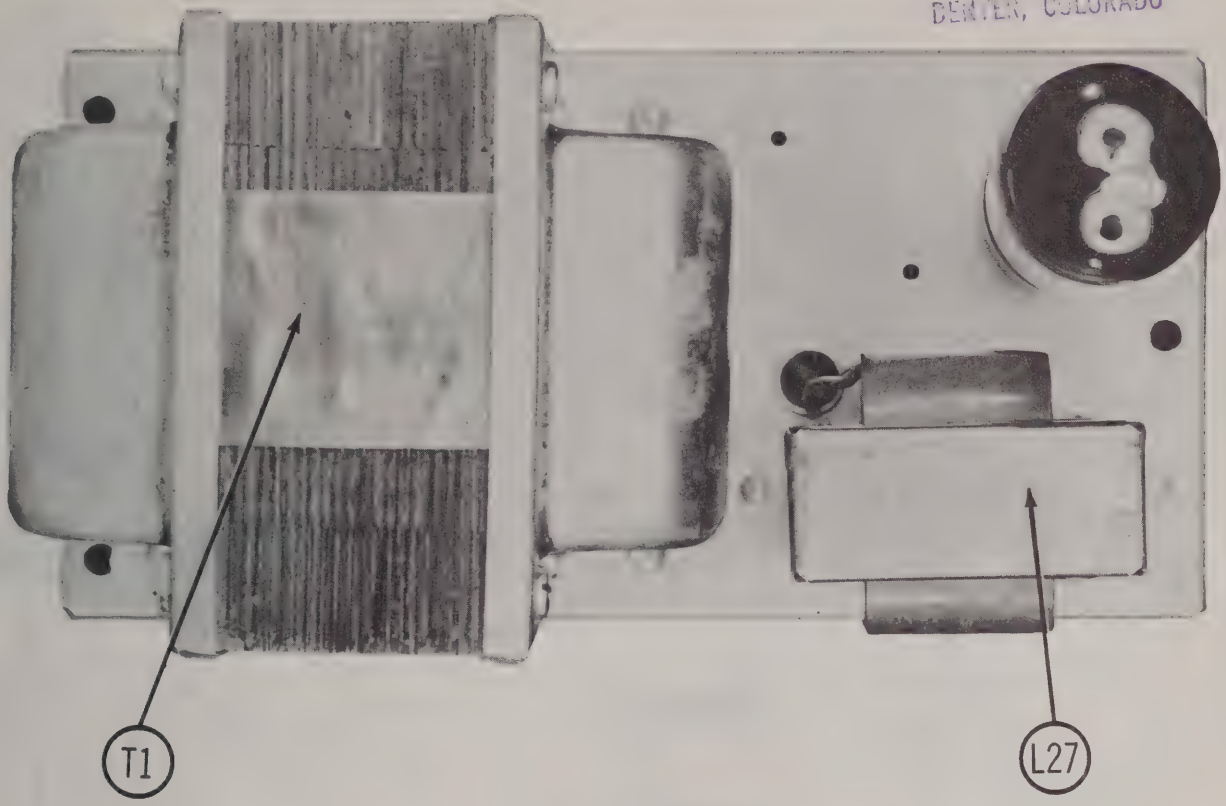
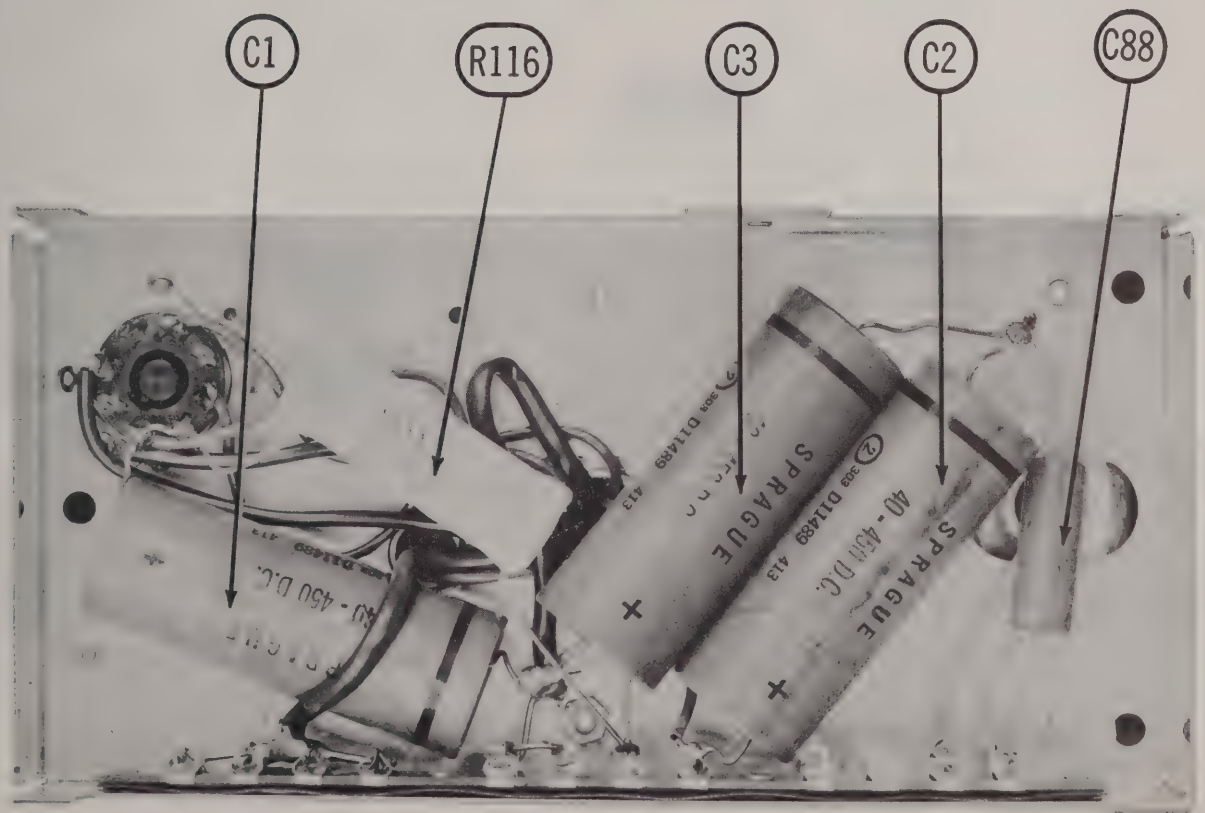
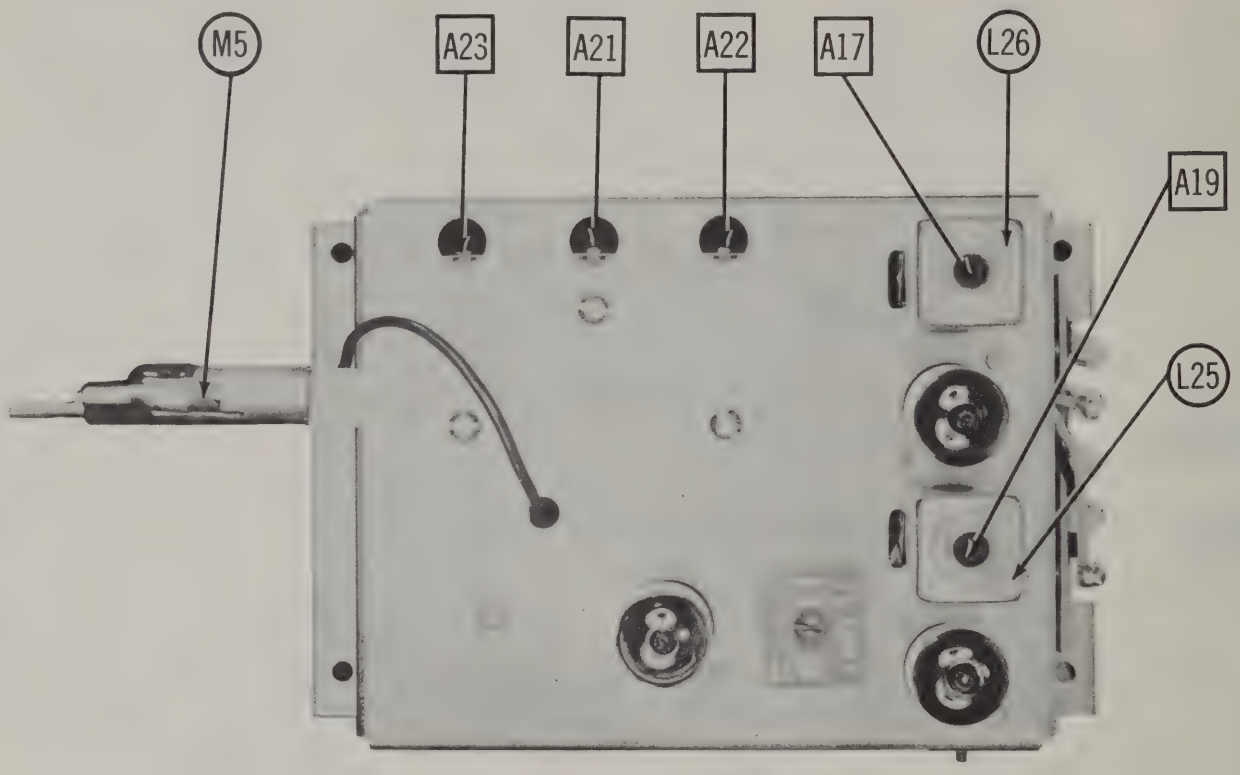
L. F. BLANKENSHIP
3004 MEADE ST.
DENVER, COLORADO



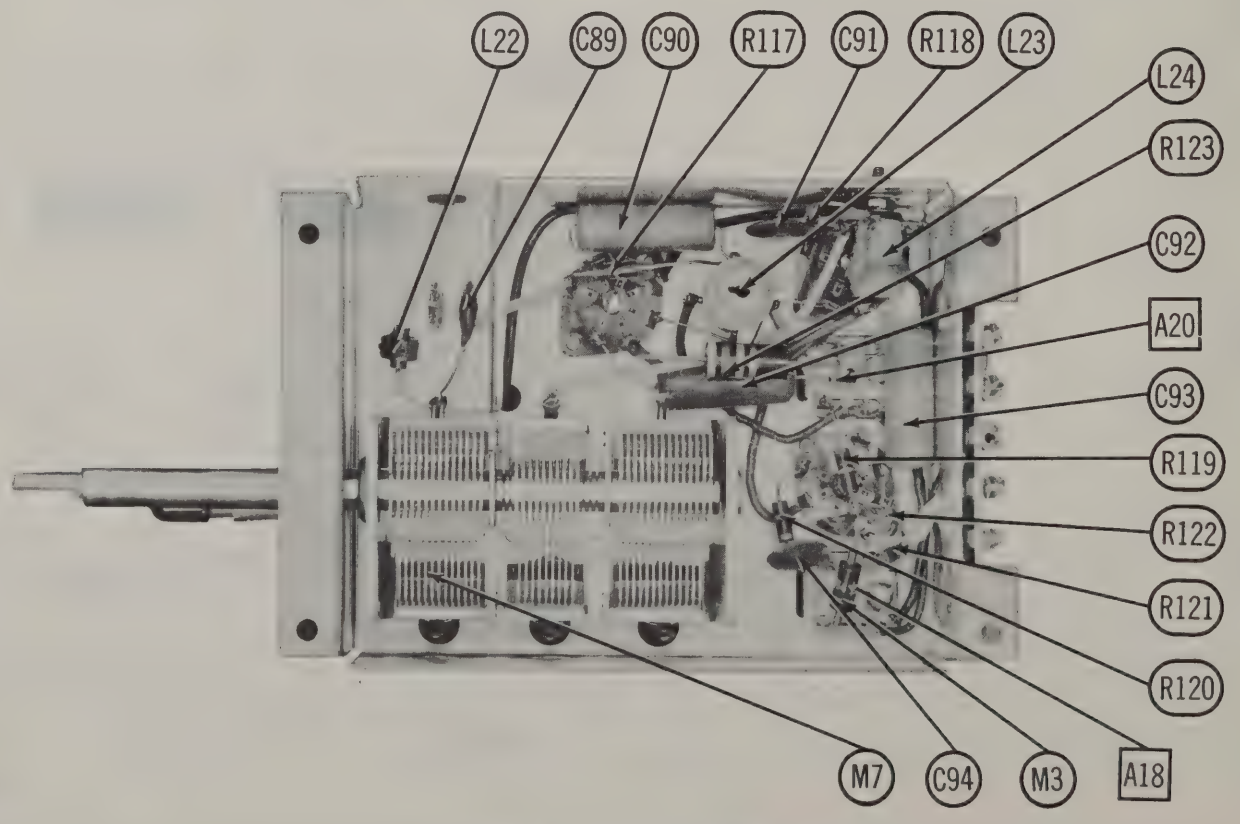
CHASSIS G TOP VIEW



CHASSIS G BOTTOM VIEW



CHASSIS H TOP VIEW



CHASSIS H BOTTOM VIEW

PHOTOFACT* Folder

ZENITH MODELS R2237 E, EU, R, RU, R2359E, EU, R, RU, R2360R, RU, R2368R, RU, R2367E, EU, Y, YU, R2387R, RU, R2391E, EU (Ch. 22R20, U)

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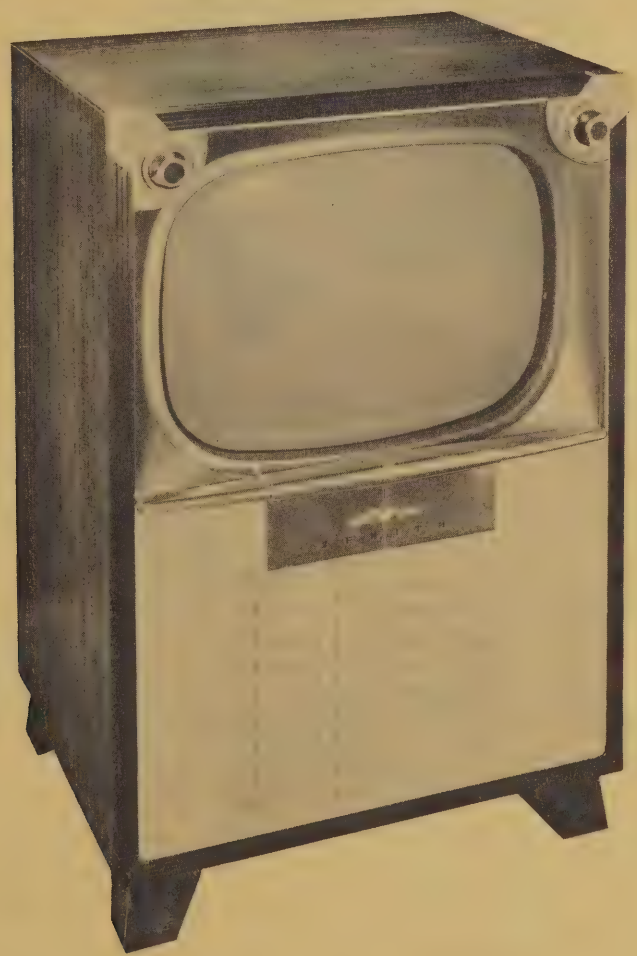

MODEL R2359R

ZENITH MODELS R2237 E, EU, R, RU, R2359E, EU, R, RU, R2360R, RU, R2368R, RU, R2367E, EU, Y, YU, R2387R, RU, R2391E, EU (Ch. 22R20, U)

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DATE 5–55 SET 276 FOLDER 10

PHOTOFACT* Folder
*TRADE MARK

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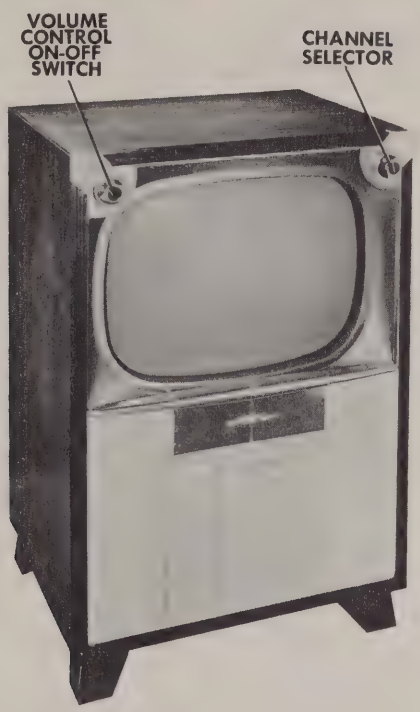

ZENITH MODEL R2359R

TRADE NAME	ZENITH	MODELS	CHASSIS
		R2337E, R2337R, R2359E, R2359R, R2360R, R2367E, R2367Y, R2368R	22R20
		R2387R, R2391E	22R20 & Radio Ch. 10L20
		R2337EU, R2337RU, R2359EU, R2359RU, R2360RU, R2367EU, R2367YU, R2368RU	22R20U
		R2387RU, R2391EU	22R20U & Radio Ch. 10L20

MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois
TYPE SET	Television Receiver
TUBES	Twenty
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 2.16 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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FOR SERVICE INFORMATION ON RADIO CHASSIS 10L20, SEE PHOTOFACT SET 233, FOLDER 13

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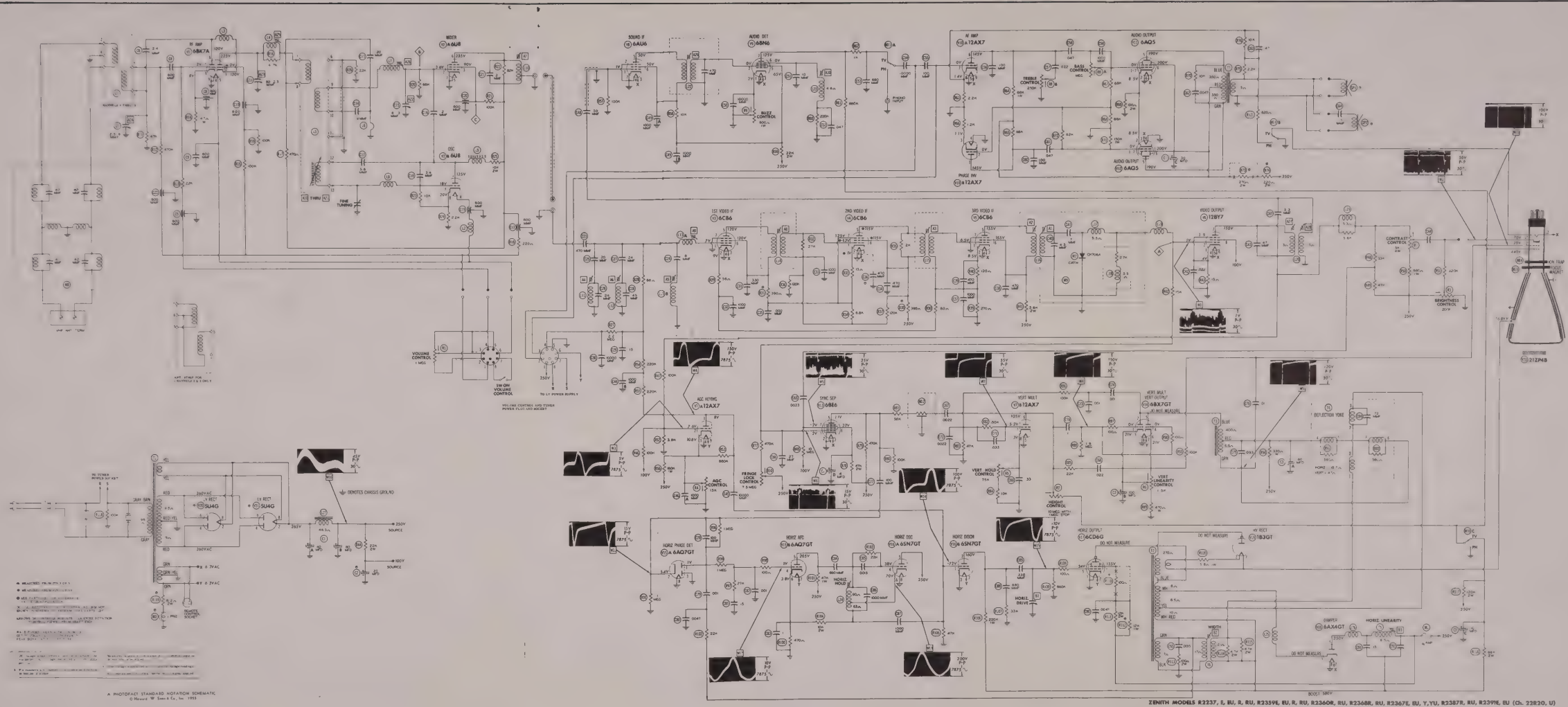

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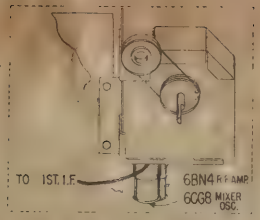

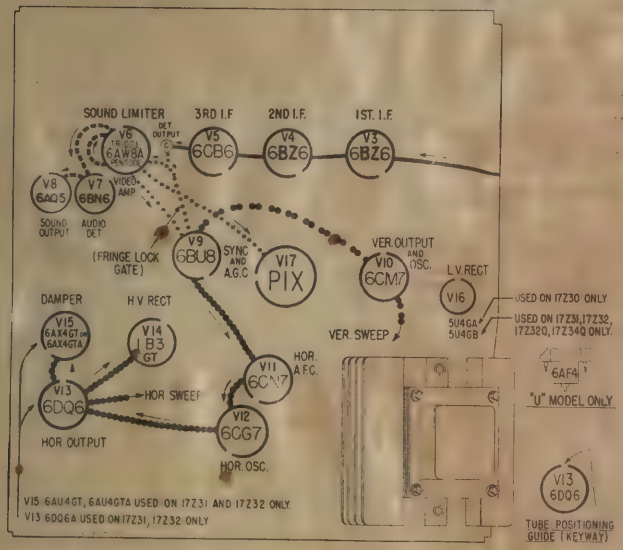

SOUND CIRCUIT
COMPOSITE VIDEO
INTERMEDIATE FREQUENCY
60 CYCLES VOLTS 117 AC

VERTICAL CIRCUIT
HORIZONTAL CIRCUIT

TV Chassis 17Z31, 17Z31U, 17Z32, 17Z32U Volts 117 AC
Watts 220 60 Cycle

Manufactured under one or more of the following United States Patents:

2,200,674	2,438,008	2,538,717	2,629,769	2,681,634
2,229,739	2,444,218	2,553,039	2,629,817	2,684,404
2,229,835	2,447,564	2,553,734	2,632,109	2,690,944
2,237,260	2,447,576	2,555,478	2,632,799	2,691,697
2,250,387	2,462,822	2,558,390	2,634,381	2,692,909
2,272,660	2,467,214	2,561,792	2,634,473	2,698,182
2,272,937	2,470,426	2,565,649	2,635,184	2,700,074
2,278,030	2,476,174	2,568,137	2,635,204	2,700,729
2,295,191	2,483,105	2,568,169	2,640,919	2,701,721
2,310,323	2,489,378	2,570,775	2,642,491	2,708,098
2,310,896	2,489,379	2,573,248	2,649,585	2,709,201
2,323,880	2,491,629	2,593,011	2,652,257	2,718,553
2,329,634	2,505,791	2,593,034	2,659,056	2,719,922
2,361,953	2,506,365	2,595,764	2,663,799	2,726,334
2,371,790	2,517,220	2,596,117	2,664,464	2,730,682
2,378,663	2,520,251	2,606,241	2,668,058	2,736,228
2,383,462	2,523,103	2,612,545	2,668,234	2,740,002
2,383,463	2,527,646	2,615,342	2,668,235	2,743,109
2,385,012	2,531,689	2,619,536	2,674,132	2,753,457
2,437,345	2,533,529	2,624,042	2,678,413	2,753,527

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ZENITH

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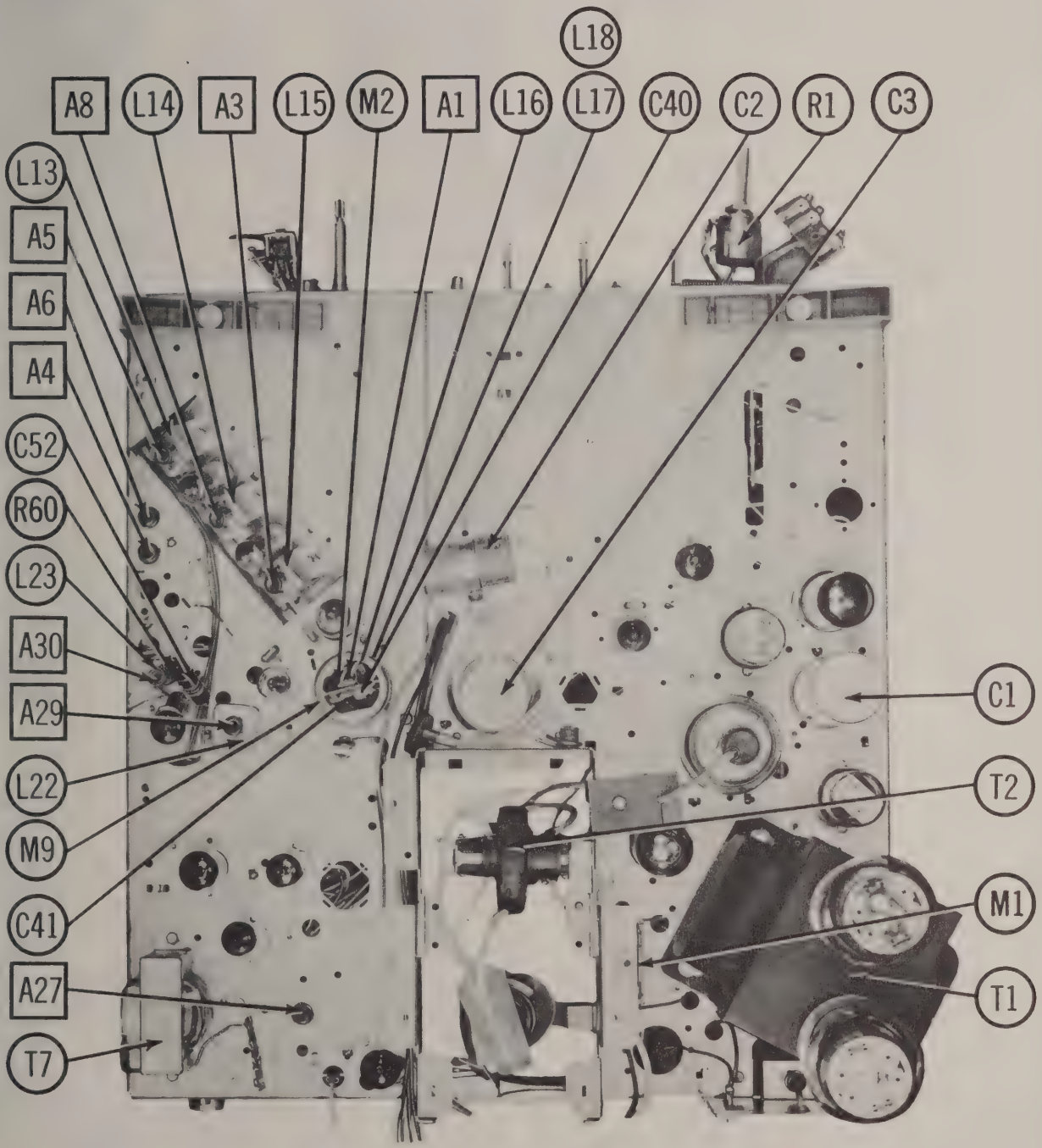
ZENITH RADIO CORPORATION, Chicago, Illinois Made in the United States of America

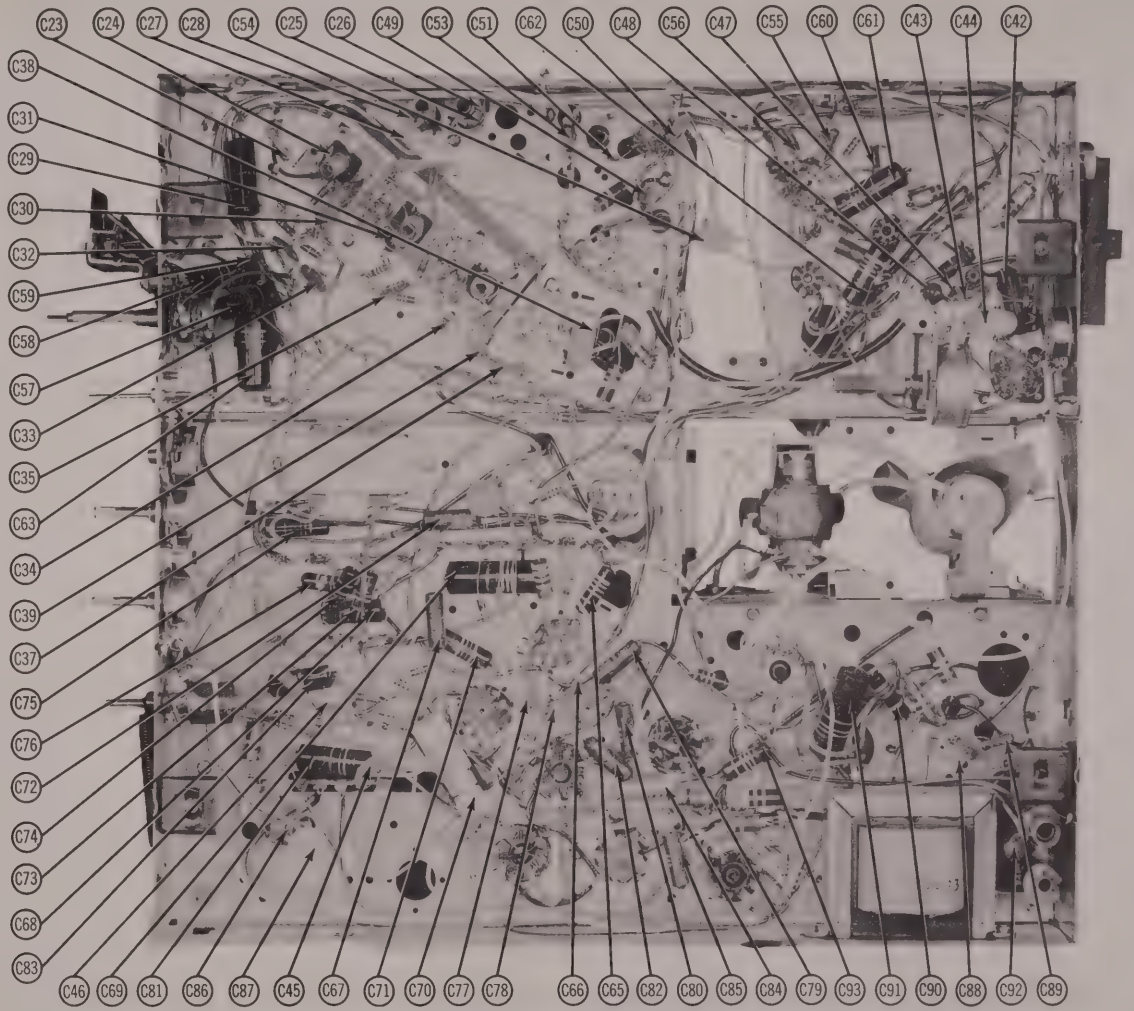
Printed in U.S.A. r.r. 102 - 2595

REPLACE WITH SAME TYPE TUBES AS ORIGINALLY SUPPLIED.



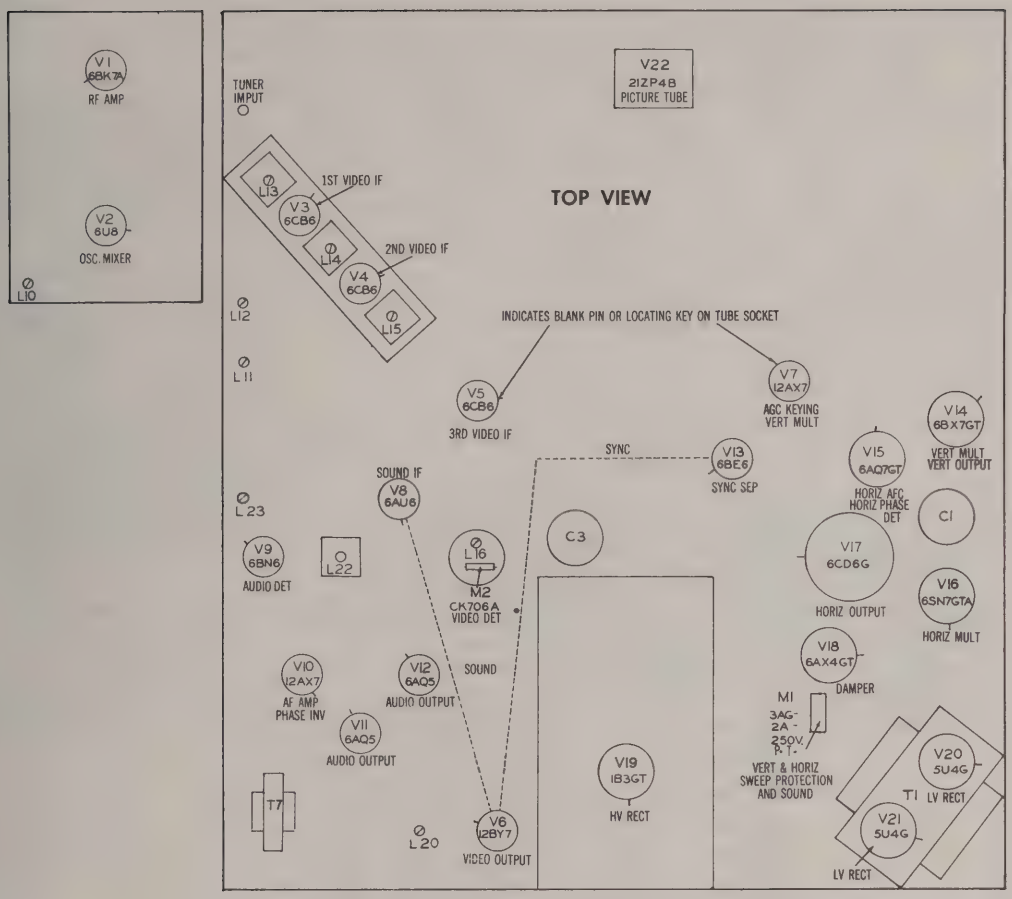
CHASSIS TOP VIEW

SET 276 FOLDER 10



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V20, V21

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V7, V22
Has pic, no sound - V8, V9, V10, V11, V12
Overloaded picture - V7

SYNC FAILURE
No vert. sync - V7, V13, V14
No horiz. sync - V13, V15, V16
No vert. or horiz. sync - V13

SWEEP FAILURE
No raster, has sound - V16, V17, V18, V19, V22, Fuse (M1)
No vertical deflection - V7, V14
Poor vert. linearity or foldover - V7, V14
Poor horiz. linearity or foldover - V16, V17, V18
Narrow picture - V16, V17, V18, V19, V20, V21
Vert. off freq. - V7, V13, V14
Horiz. off freq. - V13, V15, V16

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Picture tube may be removed from chassis for easier slug adjustment.

VIDEO IF ALIGNMENT

Connect the negative lead of a 2 volt battery to the ungrounded side of C29. Connect the positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	470MFD	High side to pin 1 (grid) of V5. Low side to chassis.	44MC (10MC Swp)	45.75MC 39.75MC 44.0MC	Any non-interfering channel	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A1, A2	Adjust A1 and A2 for maximum gain. Place marker 45.75MC and 39.75MC for correct position as on response curve (Fig. 1). If the response curve cannot be obtained check position of slugs. Be sure they are away from the center of the coils.
2.	"	High side to pin 1 (grid) of V4. Low side to chassis.	"	44MC	"	"	A3	Adjust for response similar to Fig. 2.
3.	"	High side to point (B). Low side to chassis.	"	47.25MC 41.25MC 39.75MC	"	"	A4, A5, A6	Remove the bias battery. Adjust scope gain to amplify the trap region of the response curve. Adjust for minimum marker amplitude. Adjust for response similar to Fig. 3. With maximum scope gain top of response curve may not be shown on scope.
4.	"	"	"	42.75MC 45.0MC 45.75MC	"	"	A7, A8, A9	Replace bias battery at -2 volts. Adjust for response curve similar to Fig. 4. If necessary retouch A3 for desired response. Do not readjust A1 and A2 in this step.

OSCILLATOR ALIGNMENT

The master oscillator adjustment (L8) is to be made only if the adjustment of the individual channel oscillator adjustments fail to bring the channels within the range of the fine tuning control. If channels 2 thru 6 fall within the range of the fine tuning control but the higher ones do not, slightly readjust L8 to bring in the higher channels. If channels 2 thru 6 do not fall within tuning range, readjust the bull's-eye adjustment on rear of tuner.
Connect the negative lead of a 1 volt bias to the ungrounded side of C29. Positive lead to chassis.
Turn the oscilloscope gain up so that the sound trap notch in the response curve becomes visible.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	57MC (10MC Swp)	59.75MC	2	Vert. Amp. to point (A). Low side to chassis.	A10	Adjust to place sound marker in notch as in Fig. 5.
			63MC (10MC Swp)	65.75MC	3		A11	
			69MC (10MC Swp)	71.75MC	4		A12	
			79MC (10MC Swp)	81.75MC	5		A13	
			85MC (10MC Swp)	87.75MC	6		A14	
			177MC (10MC Swp)	179.75MC	7		A15	
			183MC (10MC Swp)	185.75MC	8		A16	
			189MC (10MC Swp)	191.75MC	9		A17	
			195MC (10MC Swp)	197.75MC	10		A18	
			201MC (10MC Swp)	203.75MC	11		A19	
			207MC (10MC Swp)	209.75MC	12		A20	
			213MC (10MC Swp)	215.75MC	13		A21	

RF & MIXER ALIGNMENT

Leave the bias battery connected as under "Oscillator Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	63MC (10MC Swp)	61.25MC 65.75MC	3	Vert. Amp. thru 10KΩ to point (C). Low side to chassis.	A22, A23, A24	Adjust for response similar to Fig. 6.
7.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"	A25, A26	Adjust for symmetry of response curve (Fig. 7).

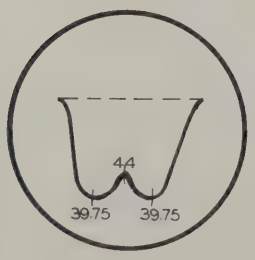


FIG. 1

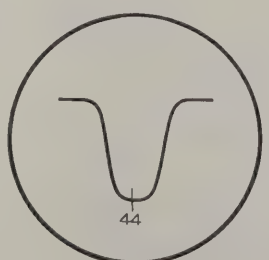


FIG. 2

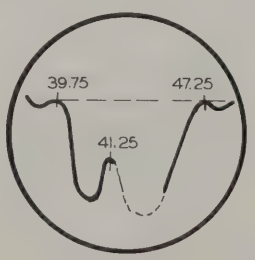


FIG. 3

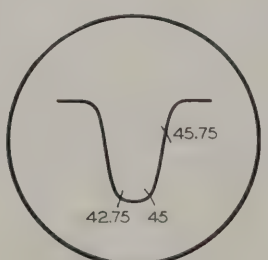


FIG. 4

ALIGNMENT INSTRUCTIONS (cont)

SOUND IF ALIGNMENT

Connect an attenuator (Zenith part #S-17203 or equivalent) in series with the receiver antenna.
Tune in a tone modulated TV signal and adjust the attenuator until the signal falls below the limiting level of the (6BN6) audio detector, as evidenced by a hiss similar to super-regeneration.
Adjust the sound take-off transformer (A27 and A28), the sound IF coil (A29) the quadrature coil (A30) for maximum sound of best quality.
Adjust the buzz control (R9) for minimum intercarrier buzz.
If the intercarrier buzz cannot be eliminated with the buzz control, check the AGC delay setting.
If during the sound IF alignment the signal rises above the limiting level (hiss disappears) increase the attenuation until the hiss returns.

UHF TUNER ALIGNMENT

Alignment of the UHF tuner should not be attempted unless proper test equipment is available.
Switch receiver to UHF position.
Leave bias supply connected as under "Video IF Alignment" and adjust for -2 volts.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Fig. 9	Across UHF antenna terminals thru matching network (Fig. 9)	713MC (10MC Swp)	711.25MC	54	Vert. thru 10KΩ to point (A). Low side to chassis.	A31	Tuner rocker arm should be in the horizontal position. If necessary, loosen the set screw and adjust tuner shaft so that rocker arm is horizontal with indicator set to channel 54. Do not adjust A31 unless oscillator calibration is off more than 3 channels. If necessary, adjust A31 for response similar to Fig. 8 with video marker at 50%. The image (weaker response) will appear, also. The response toward the counter clockwise position of A31 is the correct response.
9.	"	"	"	"	"	"	A32, A33	Adjust for maximum amplitude and symmetry of response similar to Fig. 8.
10.	"	"	473MC (10MC Swp)	471.25MC	14	"		Check for response similar to Fig. 8. If oscillator is off more than 3 channels, adjust the oscillator travel adjustment (Osc., mixer and ant. travel adjustments are the 3 round thump screws on top of the tuner) to scale. Care must be used in making these adjustments so as not to move the rocker arm out of its bearing. Set the mixer and antenna travel adjustments for maximum response on scope.
11.	"	"	887MC (10MC Swp)	885.25MC	83	"	A34, A35 A36	Adjust A34 to place video marker at 50% on response curve as in Fig. 8. Adjust A35 and A36 for maximum ampliutde and symmetrical response.

FIG. 5

FIG. 6

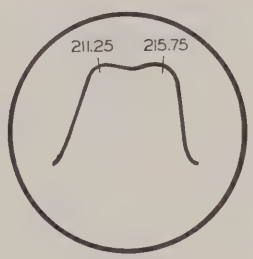


FIG. 7

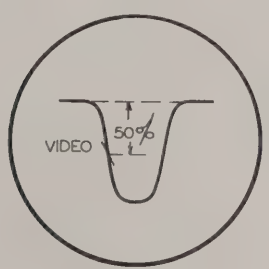


FIG. 8

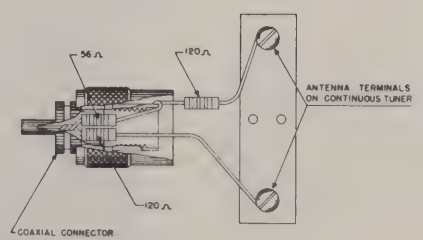


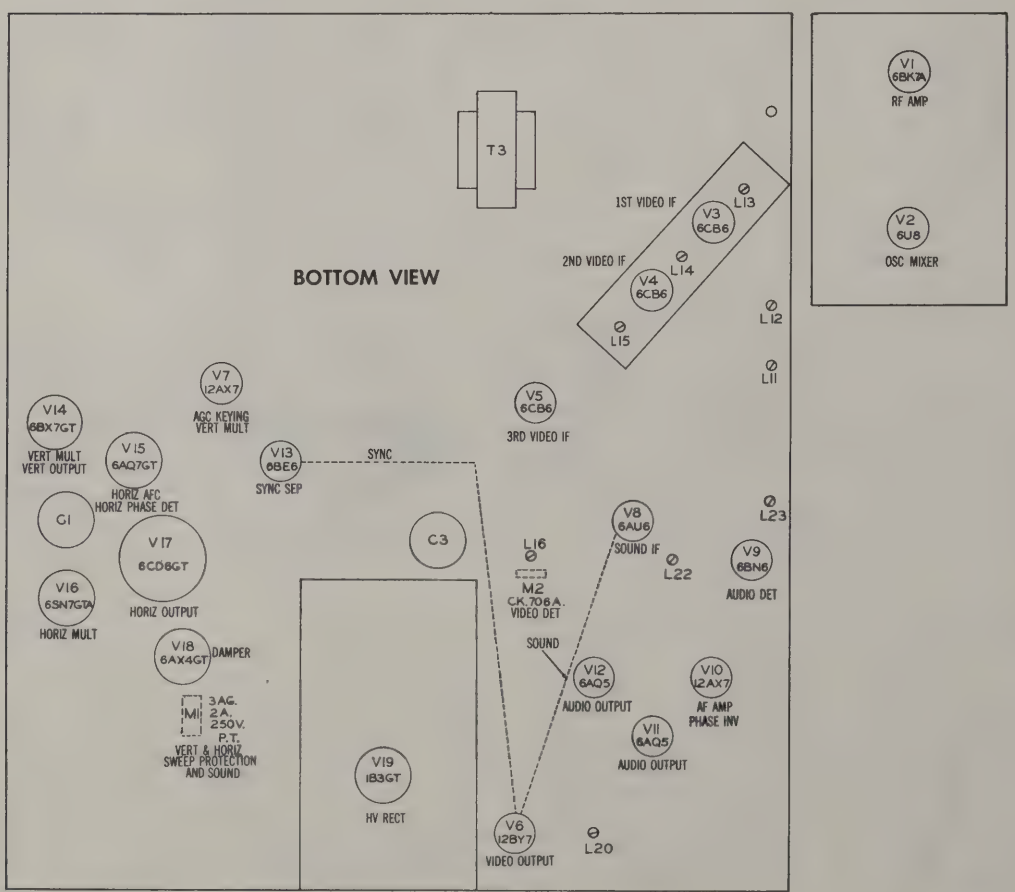
FIG. 9

ZENITH MODELS R2237 E, EU, R, RU, R2359E, EU, R, RU, R2360R, RU, R2368R, RU, R2367E, EU, Y, YU, R2387R, RU, R2391E, EU (Ch. 22R20, U)

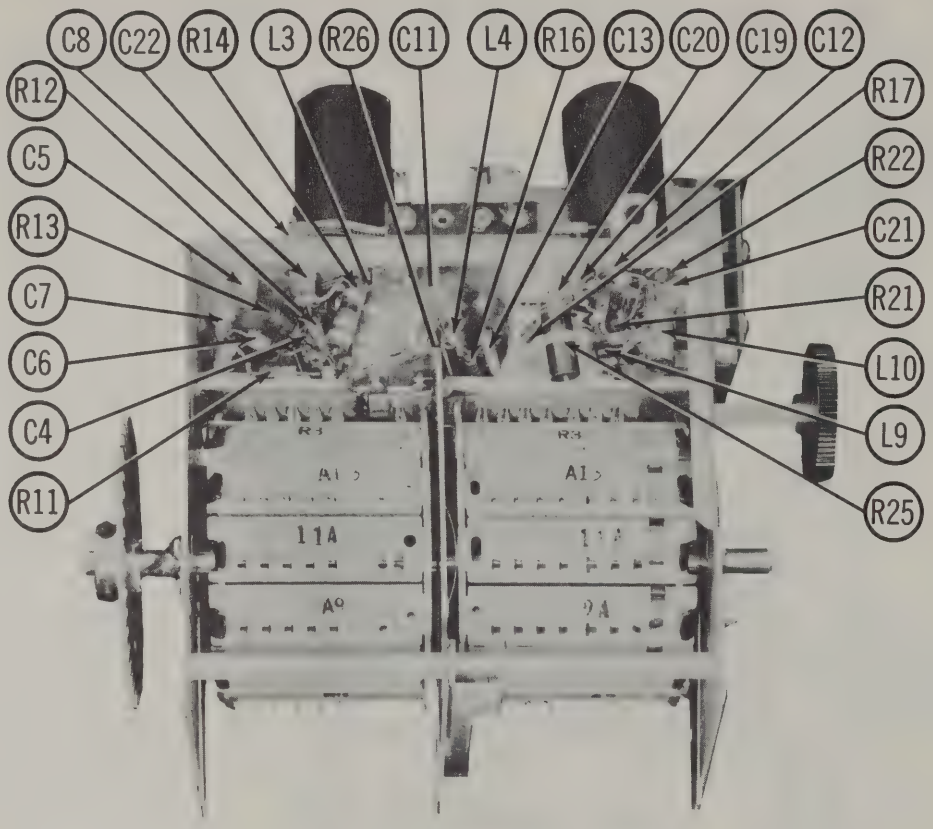
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BK7A	†750Ω	†50KΩ	INF	0Ω	.1Ω	INF	3Meg	47Ω	0Ω
V 2	6U8	†10.3KΩ	68KΩ	†100KΩ	.1Ω	0Ω	†300Ω	0Ω	2.2KΩ	12.2KΩ
V 3	6CB6	1.2Meg	500Ω	.1Ω	0Ω	■400Ω	■400Ω	0Ω		
V 4	6CB6	70KΩ	■15Ω	.1Ω	0Ω	†450Ω	†450Ω	70KΩ		
V 5	6CB6	270Ω	400Ω	.1Ω	0Ω	†5.6KΩ	†5.6KΩ	0Ω		
V 6	12BY7	15Ω	3KΩ	15Ω	0Ω	0Ω	.1Ω	†5.5KΩ	†22KΩ	15Ω
V 7	12AX7	680KΩ	3.9KΩ	9.5KΩ	0Ω	0Ω	▲6Meg	200KΩ	45KΩ	.1Ω
V 8	6AU6	100KΩ	0Ω	.1Ω	0Ω	†32KΩ	†32KΩ	0Ω		
V 9	6BN6	400Ω	.3Ω	.1Ω	0Ω	†22KΩ	220KΩ	▲750KΩ		
V 10	12AX7	†68KΩ	60KΩ	1.2KΩ	0Ω	0Ω	†68KΩ	130KΩ	2.2KΩ	.1Ω
V 11	6AQ5	130KΩ	100Ω	.1Ω	0Ω	†850Ω	†500Ω	130KΩ		
V 12	6AQ5	80KΩ	100Ω	.1Ω	0Ω	†850Ω	†500Ω	80KΩ		
V 13	6BE6	18KΩ	0Ω	.1Ω	0Ω	†100KΩ	†47KΩ	10Meg		
V 14	6BX7GT	1.8Meg	†780Ω	900Ω	1.8Meg	†780Ω	900Ω	.1Ω	0Ω	
V 15	6AQ7GT	2Meg	1Meg	0Ω	3Meg	†47KΩ	470Ω	.1Ω	0Ω	
V 16	6SN7GT	47KΩ	▲220KΩ	0Ω	33KΩ	†50Ω	10.5KΩ	.1Ω	0Ω	
V 17	6CD6G	INF	.1Ω	0Ω	680KΩ	680KΩ	†6KΩ	0Ω	†6KΩ	Top Cap ▲8Ω
V 18	6AX4GT	17Ω	INF	220KΩ	220KΩ	†65Ω	†65Ω	.1Ω	0Ω	
V 19	1B3GT		PINS	1 - 8	HAVE	INFINITE	RESISTANCE			▲278Ω
V 20	5U4G	INF	30KΩ	INF	10Ω	INF	9Ω	INF	30KΩ	
V 21	5U4G	INF	30KΩ	INF	10Ω	INF	9Ω	INF	30KΩ	
V 22	21ZP4B	0Ω	100KΩ	Pin 10 ▲68KΩ	Pin 11 †280KΩ	Pin 12 .1Ω				

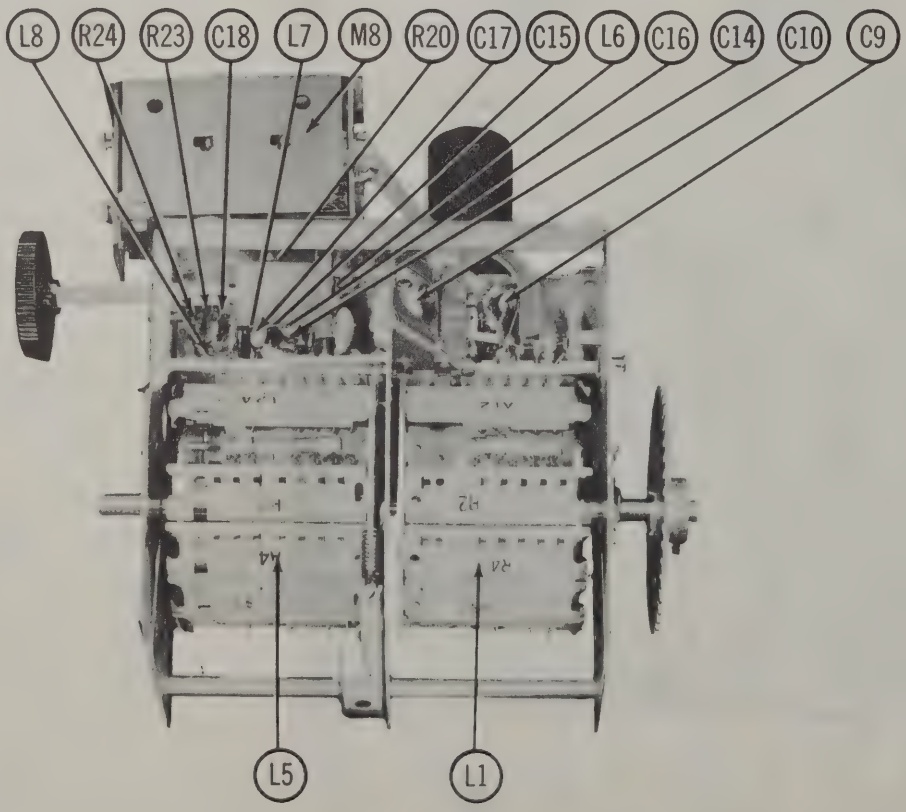
† MEASURED FROM PIN 2 OF V21.
■ MEASURED FROM PIN 7 OF V4.
▲ MEASURED FROM PIN 3 OF V18.



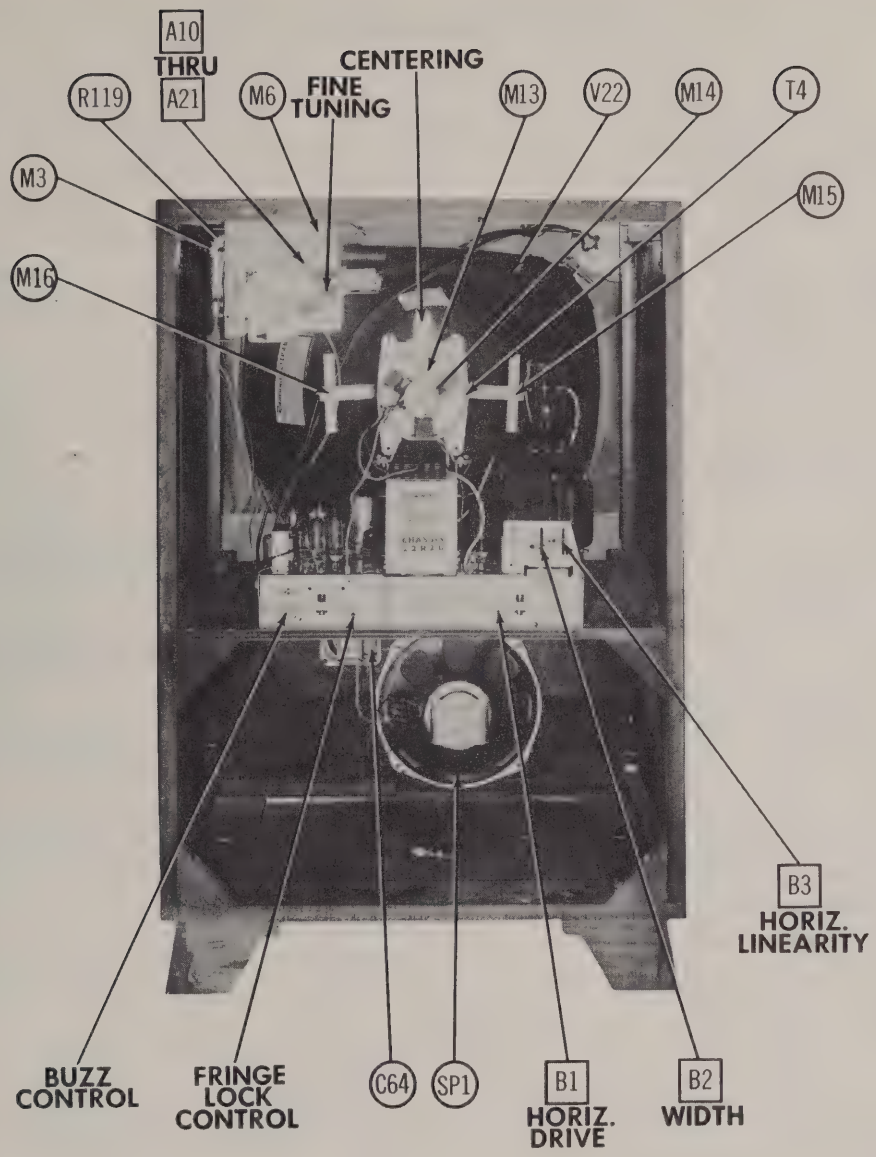
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Adjust the horizontal hold (L24) located on front of chassis until picture synchronizes horizontally.

Adjust the horizontal drive trimmer (B1) for greatest width.

Adjust the width slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B3) for a picture that is symmetrical from left to right.

AGC DELAY CONTROL ADJUSTMENT

Connect the vertical amplifier of an oscilloscope thru 10KΩ to point ◇A. Select the strongest signal being received and adjust the delay control for 2 volts peak output.

ZENITH MODELS R2237 E, EU, R, RU, R2359E, EU, R, RU, R2360R, RU, R2368R, RU, R2367E, EU, Y, YU, R2387R, RU, R2391E, EU (Ch. 22R20, U)

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V16, V17, V18, V20 and V21. Check adjustments B1, B2 and B3. Check T2, T4A, C89, R111, R112 and other associated components.

DRIVE LINES

Check by substitution V16, V17 and V18. Check adjustments B1 and B3. Check C89, R111, R112, R114, R115 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V17 and V18. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V15, V16, V17 and V18. Check C82 for open. Check L24, R101, R100, C86 and other associated components.

XMAS TREE EFFECT

Check by substitution V15, V16, V17 and V18. Check T2 and T4 for internal arcing. Check C79, C80, C83, C86, L24 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V7 and V14. Check waveform W8.

If Satisfactory	If Unsatisfactory
Check T3, T4B, R94, R89, C3A and other associated components.	Check R2, R117, C67, C70 and other associated components.

INSUFFICIENT SWEEP

Check by substitution V7 and V14. Check vertical size and vertical linearity controls for proper operation. Check T3, T4B, R2, R116 and other associated components.

COMPRESSED AT BOTTOM

Check by substitution V7 and V14. Check R2, R116, C70, C71 and other associated components.

COMPRESSED AT TOP

Check by substitution V7 and V14. Check R89, R6, C3B, C70, T3 and other associated components.

FOLDS

Check by substitution V7 and V14. Check R85, R89, R6, C68, C3B and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Substitute V13. Check C65, R44, R78, R79 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Substitute V7. Check C67, C69, M12, R84, R5 and other associated components.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V15 and V16. Check C77, C78, C79, C86, L24 and other associated components.

HORIZONTAL BENDING

Check by substitution V7, V13, V15 and V16. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Substitute V6. Check L19, L21, R50, R44, C44 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A27. Check video IF alignment.

POOR CONTRAST

Substitute V6. Check video crystal detector network. Check contrast control. Check L19, L21, C43, C44, R50 and other associated components.

NEGATIVE PICTURE

Substitute V6. Check picture tube. Check video crystal detector network. Check R43, L21, C44 and other associated components.

SMEAR

Substitute V6. Check L19, L21, C44 and R50. Check video IF alignment.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5, V6 and V7 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V8, V9, V10, V11 and V12. Check stages V10, V11 and V12 using audio signal generator. Apply audio signal across R1.

If Satisfactory	If Unsatisfactory
Check audio detector and audio IF stages for component failure or change of value.	Check C58, C56, C61, C62, C1C, R64, R67, R69, R73, R74, T7, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustments A30 and R9. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

POWER

DEAD SET

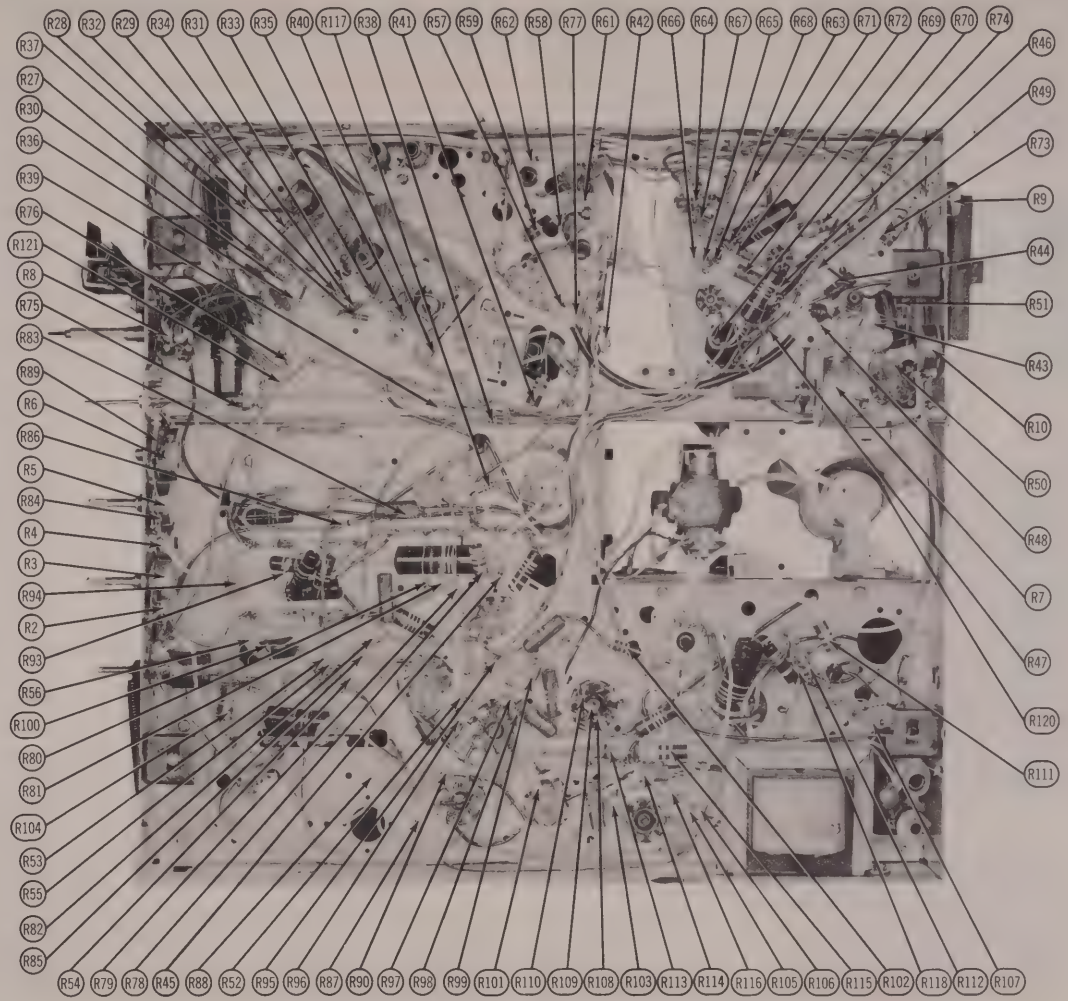
If filaments fail to light, check AC interlock assembly. Check tuner plug for good connections. Check switch on volume control and T1. If filaments light, check by substitution V20, V21 and V18. Check B+ filter and decoupling network. Check M1 fuse.

SMALL AND/OR DIM PICTURE

Check by substitution V20 and V21. Check B+ filter and decoupling network.

ALTERNATE TUNER SCHEMATIC

ZENITH MODELS R2237 E, EU, R, RU, R2359E, EU, R, RU, R2360R, RU, R2368R, RU, R2367E, EU, Y, YU, R2387R, RU, R2391E, EU (Ch. 22R20, U)



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

ZENITH MODELS R2337 E, EU, R, RU, R2359E, EU, R, RU, R2360R, RU, R2366R, RU, R2367E, EU, Y, YU, R2387R, RU, R3991E, EU (CH. 22R20, U)

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		ZENITH PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	6BK7A	6BK7A	9AJ	
V2	Osc. - Mixer	6U8	6U8	9AE	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Output	12BY7	12BY7	9BF	
V7	AGC Keying - Vert. Mult.	12AX7	12AX7	9A	
V8	Sound IF Amp.	6AU6	6AU6	7BK	
V9	Audio Detector	6BN6	6BN6	7DF	
V10	AF Amp. - Phase Inverter	12AX7	12AX7	9A	
V11	Audio Output	6AQ5	6AQ5	7BZ	
V12	Audio Output	6AQ5	6AQ5	7BZ	
V13	Sync Separator	6BE6	6BE6	7CH	
V14	Vert. Mult. - Vert. Output	6BX7GT	6BX7GT	8BD	
V15	Horiz. AFC - Horiz. Phase Det.	6AQ7GT	6AQ7GT	6CK	
V16	Horiz. Osc. - Horiz. Discharge	6SN7GT	6SN7GT	8BD	
V17	Horiz. Output	6CD6G	6CD6G	5BT	
V18	Damper	6AX4GT	6AX4GT	4CG	
V19	HV Rectifier	1B3GT	1B3GT	3C	
V20	LV Rectifier	5U4G	5U4G	5T	5U4GA used as an alternate
V21	LV Rectifier	5U4G	5U4G	5T	5U4GA used as an alternate

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA					RETMA BASE TYPE	NOTES
	ZENITH PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.		
V22	21ZP4B ①	21ZP4B ① 21ZP4A	21ZP4B ① 21ZP4A	21ZP4B ① 21ZP4A 21ZP4 ②	21ZP4B ① 21ZP4A	12N 12N	① Aluminized ② Circuit changes necessary

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	ZENITH PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	■40	400	22-2597			FP385.5		Q-065	
B	▲80	400				TC77		MT-4504	
C	▲30	400							
D	4	350							
C2	20	400	22-2389			TC75	TD-20-450	FM-4520	Note 1
C3A	▲40	400	22-2368			FP459		FM-4540	
B	▲100	50						T-810	
C	■10	475							
D	10	25							Note 2
C4	800		22-2331	DD-801	801-001	DC-521			
C5	800		22-2577						
C6	2.4		22-2596						
C7	2.5-6		22-2221						
C8	800		22-2577						
C9	800		22-2331	DD-801	801-001	DC-521			
C10	800		22-2577						
C11	.85-2.3		22-2453	829-3	3115-01-0R5	CT565A			
C12	800		22-2577						
C13	120		22-2591	D6-121	811-121	UC-5312			
C14	19		22-2406						
C15	.6-3		22-2504	829-3	3115-01-0R5	CT565A			
C16	2		22-2434						
C17	5.6		22-2499						
C18	3.4		22-2592						
C19	800		22-2577						
C20	800		22-2577						
C21	2		22-2585						
C22	800		22-2577						
C23	470		22-2214	D6-471	GP2K-471	UC-5347		K-1347	
C24	8		22-2481						
C25	20		22-2593	TCZ-20	NP0K-200	ZT-542			
C26	24		22-2515	TCZ-24	NP0L-240				
C27	24		22-2515	TCZ-24	NP0L-240				
C28	45		22-2600						
C29	.15	200	22-2147			PT4015	IMP2-P15	3302015	
C30	10000		22-3	DD-103	811-01	DC-511			
C31	330		22-2309	D6-331	GP2K-331	UC-5333		K-1333	
C32	1000		22-7	DD-102	801-001	DC-521		K-1210	
C33	1000		22-7	DD-102	801-001	DC-521		K-1210	
C34	470		22-2302	D6-471	GP2K-471	UC-5347		K-1347	
C35	1000		22-7	DD-102	801-001	DC-521		K-1210	
C36	470			D6-471	GP2K-471	UC-5347		K-1347	Note 2
C37	1000		22-2112	D6-1000	GP2L-102	UC-521		K-1210	
C38	470	500	22-2524	D6-471	GP2K-471	MC245		K-1347	
C39	470		22-2214	D6-471	GP2K-471	UC-5347		K-1347	
C40	4.5		22-2522						
C41	7		22-2375						
C42	.022	200	22-2071	DF-203	817-02	PT4122	IMP4-S22	3304122	
C43	47		22-2467						
C44	.1	200	22-1777	DF-104		PT401	IMP2-P1	330201	
C45	10000		22-3	DD-103	811-01	DC-511			
C46A	1000		22-2545	DD2-102	812-001	DCD-521		K-1210	
B	1000							K-1210	
C47	3.3		22-2343	TCZ-3.3	NP0A-3R3	ZT-5533			
C48	50		22-2460	D6-500	GP1K-500	UC-545		K-1450	
C49A	1000		22-2553	DD2-102	812-001	DCD-521		K-1210	
B	1000							K-1210	
C50	10000		22-3	DD-103	811-01	DC-511			
C51	10		22-2378		NP30K-100				
C52	.047	200	22-1778	DF-503		PT4147	IMP2-S47	3302147	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA ZENITH PART No.	CENTRALAB PART No	ERIE PART No	MALLORY PART No	PYRAMID PART No	SANGAMO PART No	NOTES
C53	680		22-2320	D6-681	GP2K-681	UC-5368		K-1368	
C54	10000		22-3	DD-103	6U-01	DC-511			
C55	100		22-5	D6-101	GP1K-101	UC-531		K-1310	
C56	100		22-5	D6-101	GP1K-101	UC-531		K-1310	
C57	.022	600	22-1813	DF-203	817-02	PT6122	IMPE-422	3306123	
C58	.047	600	22-1844	DF-503		PT6147	IMPE-547	3306147	
C59	1000		22-2598	DD-102	501-001	DC-531		K-1310	
C60	100		22-5	D6-101	GP1K-101	UC-531		K-1310	
C61	.047	600	22-1844	DF-503		PT6147	IMPE-647	3306147	
C62	.0047	1600	22-2564	DD16-472	1R5KV-472	PT15247	CT16-D47		
C63	.47	200	22-2146			PT4047	IMPJ-P47	3303047	
C64	1.0	150	22-2468			PT61	CT9-1	330310	
C65	.0033	600	22-2631	D6-332	GP2-333-332	PT6323	IMPE-D33	3306333	
C66	27		22-2396		TC2-27				
C67	.0022	600	22-1803	D6-222	GP2-333-222	PT6222	IMPE-D22	3306322	
C68	.022	600	22-1813	DF-303	817-02	PT6122	IMPE-622	3306123	
C69	33	500	22-2152					3306333	
C70	.1	600	22-2061	DF-104		PT601	IMPE-P1	330601	
C71	.033	300	22-2310						
C72	.0022	300	22-2181					CR-1322	
C73	.001	600	22-2138			MCB255		KR-1210	
C74	.001	600	22-2138			MCB255		KR-1210	
C75	.033	200	22-1778			PT4333	IMPE-33	3306123	
C76	.01	400	22-1846	D6-103	GP2-333-103	PT611	IMPE-61	330611	
C77	100	500	22-1442			MCB355		KR-1310	
C78	180	500	22-2506					KR-1312	
C79	.001	500	22-1839	D6-102	GP2L-102	PT621	IMPE-D1	330231	
C80	.0047	300	22-1842			MCB465		CR-1347	
C81	.15	300	22-2268						
C82	.001	600	22-1839	D6-102	GP2L-102	PT621	IMPE-D1	330231	
C83	.1	200	22-1777	DF-104		PT401	IMP2-P1	330201	
C84	680	500	22-2125					KR-1268	
C85	.0015	400	22-1786	D6-153	GP2L-152	PT6215	IMPE-D1	3306215	
C86	1000	500	22-2163			MCB355		KR-1310	
C87	1000		22-2396	DD-102	501-001	DC-521		K-1210	
C88	680		22-2327	D6-681	GP2K-681	UC-5368		K-1368	
C89	330		22-2309	D6-331	GP2K-331	UC-5333		K-1333	
C90	.0047	400	22-1783	D6-472	GP2-333-472	PT6247	IMPE-D47	330425	
C91	.15	400	22-2341						
C92	.1	400	22-2340						
C93	.0015	600	22-2586			MCB356		CR-1215	
C94	.72	2000							

Note 1. Some versions use 4MFD in this application.
Note 2. Not used in some versions.

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ZENITH PART No	IRC PART No	CLAROSTAT PART No	CENTRALAB PART No	MALLORY PART No	INSTALLATION NOTES
R1A	1Meg	½	83-3239	Q13-157	A47-1Meg-2	B-70-S	U-53	Volume
B	Shaft		Not Req.	Not Req.	FS-2	Not Req.	Not Req.	Attach to R1A
C	Sw. Cover		Not Req.	Not Req.	Not Req.	KS-5	Not Req.	Attach to R1A
D	Switch		Not Req.	78-1	SWE-12	Not Req.	U6-36	Attach to R1A
R2A	10Meg with 1Meg stop	½	83-3946	Q11-143	A47-10Meg-S	AB-28	U-52	Height - Note 1
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R2A
R3A	200KΩ	½	83-2937	Q11-139	A47-200K-S	AB-46	U-43	Brightness
B	Shaft		Not Req.	Not Req.	KS6-3	AK-4	Not Req.	Attach to R3A
R4A	15KΩ	½	83-3076	Q11-119	A47-15K-S	AB-20	U-36	AGC
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R4A
R5A	75KΩ	½	83-3223	Q11-125	A47-75K-S	AB-25	U-41	Vert. Hold
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R5A
R6A	1500Ω	½	83-2885	WK-1500	A47-1500-S	AB-1	B1U-6	Vert. Linearity
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R6A
R7A	5000Ω	4	83-3201		A10-5000	BVP-999	M5MPK	Contrast (Wire wound)
B	Shaft		Not Req.		RQ-2	Not Req.	Not Req.	Attach to R7A
R8A	1Meg	½	83-3224	*QJ-625		F1-53	UF16L	Bass - Panel
B	250KΩ	½				R3-35	RV254A	Treble - Rear
C	Spring						R5-1	Not Req.) Attach to R8A
R9	600Ω		83-3187			39-600		Buzz (Wire wound)
R10A	7.5Meg	½	83-3240	Q11-143		A47-7.5Meg-S	AB-98	U-52 Shaft Lock
B	Shaft		Not Req.	RQ		FKS-1/4	AK-1	Not Req. Attach to R10A

† Universal replacement (Mallory exact duplicate part no. UZ-4507)
* CONCENTRIKIT EQUIVALENT: KIT K-2. BASE ELEMENTS & SHAFTS: B1T-137 & P1-126 (PANEL) B13-130 & R7-208 (REAR)

Note 1: Connect a 1Meg resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control. (Control viewed from shaft end, terminals down.)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ZENITH Part No.	IRC Part No.	NOTES
R11	47KΩ	½	63-1854	BTS-47K	
R12	470KΩ	½	63-1847	BTS-470K	Note 1
R13	22KΩ	½		BTS-22K	
R14	47Ω	1	63-1729		
R15	100KΩ	½	63-1869	BTS-100K	
R16	470Ω	1	63-1813	BTS-470	
R17	47Ω	1	63-1772	BTS-470	
R18	22Ω	1	63-1756	BTS-220	
R19	100KΩ	½	63-1729	BTS-100K	
R20	68KΩ	½	63-1862	BTS-68K	
R21	100KΩ	½	63-1869	BTS-100K	
R22	82KΩ	½	63-1865	BTS-82K	
R23	10KΩ	½	63-1838	BTS-10K	
R24	220Ω	½	63-1800	BTS-220Ω	
R25	10KΩ	2	63-3170	BTB-10K	
R26	22KΩ	½	63-1842	BTS-22K	
R27	2.2Meg	½	63-1928	BTS-2.2Meg	
R28	68Ω	½	63-1737	BTS-68	
R29	56Ω	½	63-1733	BTS-56	
R30	180Ω	½	63-1754	BTS-180	
R31	390Ω	½	63-1772	BTS-390	Note 1
R32	27KΩ	½	63-1845	BTS-27K	
R33	100Ω	½	63-1706	BTS-10	
R34	68000Ω	½	63-1831	BTS-6800	
R35	12KΩ	½	63-1831	BTS-12K	
R36	120KΩ	½	63-1873	BTS-120K	
R37	130KΩ	½	63-1873	BTS-130K	
R38	390Ω	½		BTS-390	Note 1
R39	270Ω 5%		63-1760	BTS-270 5%	
R40	120Ω	½	63-1741	BTS-120	
R41	5600Ω	2	63-3223	BTS-5600	
R42	15KΩ	½	63-1854	BTS-15K	
R43	15Ω	½	63-1708	BTS-15	
R44	22KΩ	2	63-1866	BTS-22K	
R45	10Meg	½	63-1953	BTS-10Meg	
R46	100KΩ	½	63-1869	BTS-100K	
R47	100KΩ	½	63-1869	BTS-100K	
R48	33KΩ	½	63-1848	BTS-33K	

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ZENITH PART No	IRC PART No	NOTES
R49	47KΩ	½	63-1855	BTS 47K	
R50	68Ω	½	63-2290	BTA-68Ω	
R51	220KΩ	½	63-1864	BTS-220K	
R52	100KΩ	½	63-1869	BTS-100K	
R53	680KΩ	½	63-1904	BTS-680K	
R54	220KΩ	½	63-1864	BTS-220K	
R55	220KΩ	½	63-1864	BTS-220K	
R56	180KΩ	½	63-3313	BTA-180K	
R57	100KΩ	½	63-1870	BTS-100K	
R58	10KΩ	½	63-1837	BTS-10K	
R59	22KΩ	½	63-3141	BTS-22K	
R60	220KΩ	½	63-1883	BTS-220K	
R61	680KΩ	½	63-1904	BTS-680K	
R62	100KΩ	½	63-1786	BTS-100K	
R63	2200Ω	½	63-1798	BTS-2200	
R64	68KΩ	½		BTA-68K	
R65	68KΩ	½	63-1863	BTS-68K	
R66	1300Ω	½	63-1789	BTS-1300	
R67	68KΩ	½	63-1863	BTS-68K	
R68	68KΩ	½	63-1863	BTS-68K	
R69	100Ω	½	63-1873		
R70	10KΩ	½	63-1838	BTS-10K	
R71	150KΩ	½	63-1877	BTA-150K	
R72	68KΩ	½	63-1866	BTS-68K	
R73	270Ω	2			Note 2 & 4
R74	220Ω	2			Note 3 & 4
R75	2200Ω	½	63-1798	BTS-2200	
R76	10KΩ	½	63-1838	BTS-10K	
R77	470KΩ	½	63-1897	BTS-470K	
R78	47KΩ	½	63-1847	BTS-47K	
R79	470KΩ	½	63-1897	BTS-470K	
R80	100KΩ	½	63-1869	BTS-100K	
R81	56KΩ	½		BTS-56K	
R82	150KΩ	½	63-1876	BTS-150K	
R83	47KΩ	½	63-1855	BTS-47K	
R84	10KΩ	½	63-1838	BTS-10K	
R85	22KΩ	½	63-1841	BTS-22K	

Note 1: Some versions may use a 470Ω resistor in this application.
Note 2: Not used in some versions.
Note 3: Some versions may use a 470Ω 7 watt resistor in this application.
Note 4: When replacing this resistor use original clamp or double wattage of replacement.
Note 5: Some versions may use a 22KΩ 1 watt resistor in this application.

TRANSFORMER (POWER)

ITEM No	RATING PRI.	RATING SEC 1	RATING SEC 2	REPLACEMENT DATA ZENITH PART No	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordorson PART No.
T1	117VAC	550VCT	5VAC	95-1900						
	②3.16A	.380ADC	③ 6A							
	SEC. 3	SEC. 4	SEC. 5							
	(2. 5VCT ④) 6. 4A									

SPEAKER

ITEM No.	RATINGS SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA ZENITH PART No.	VIKING PART No.	QUAM PART No.	NOTES
SP1	10"	PM	3.8Ω	49-764		10A10Q3.2	① Use in Models R2387R, R2387RU,
SP2	3½"	PM	11.8Ω	49-777 ①		3A15 T	R2391E and R2391EU
	12"	PM	3.8Ω	49-778 ①			② Used in Models R2337E, R2337R,
	?1"	PM	3.8Ω	49-779 ②	8J9	8A21	R2337EU and R2337RU

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA ZENITH PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No	Rons PART No.	Stancor PART No	Thordorson PART No.	Triad PART No.
T2	Horiz. Output Trans.	5-22130 ①							
T3	Vert. Output Trans.	95-1877	Z180Z ② ③	A-3038 ② ④		V307 ② ③	A-8148 ③	36872 ② ③	A-108X ② ④
T4A	Yoke-Horiz. (23MH)	96-1406 ①	DF80Z ②	MDF-72 ②	21ID8 ③	T70P34/ ③ 43	DY-8A ③	Y-7 ③	Y-17-1 ③
B	Vert. (41MH)								
T5	Horiz. Lin. Coil	5-18542 ③	RF800 ③	MWC-2 ③	20T11 ③	20R13A ③	WC-7 ③	WC-18 ③	WC-13 ③
	(5.5-23MH)	140-126 ③							
T6A	Width (3.8-22MH)	5-18743 ③						WC-24	
B	L. (4.2-6MH)	140-101 ④							

① Complete assembly includes: Winding and terminal assembly: Zenith Part #6-22189
Tertiary winding and terminal assembly: Zenith part #6-22171.
② Drill new mounting hole(s).
③ Connect as auto transformer.
④ Connect blue lead to plate, white and red leads to yoke Cut green lead short and tape end.
⑤ Includes capacitor C94, resistors R91 and R92.
⑥ See instructions packed with unit pertaining to yoke damping network.
⑦ Connect horizontal damping network across terminals #3 and #7. Use original network if necessary.
⑧ Remove damping capacitor from terminals #1 and #2. Use original horizontal network if necessary.
⑨ Includes clip, Zenith part #18-2391.
⑩ Iron core and spring for horizontal linearity coil assembly.
⑪ Drill new mounting hole or use original slider, clip and core.
⑫ Connect to terminals #3 or #4 and "CT".
⑬ Do not use tap.
⑭ Iron core and spring for width coil assembly.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA ZENITH PART No	Stancor PART No	Merit PART No.	Triad PART No	Halldorson PART No.	Thordorson PART No	NOTES
T7	8.8KΩ	3.8Ω	95-1396	A-3824	A-2904 ①	S-53X	21011	22588 ①	① Drill one new mounting hole.

COILS (RF-IF)

ITEM No	USE	DC RES PRI	DC RES SEC	REPLACEMENT DATA ZENITH PART No	MESSNER PART No.	MERIT PART No	MILLER PART No.	NOTES
L1A	Ant. Coil	0ΩCT	0Ω	5-21712				Channel 2
B	Ant. Coil	0ΩCT	0Ω	5-21713				Channel 3
C	Ant. Coil	0ΩCT	0Ω	5-21714				Channel 4
D	Ant. Coil	0ΩCT	0Ω	5-21715				Channel 5
E	Ant. Coil	0ΩCT	0Ω	5-21716				Channel 6
F	Ant. Coil	0ΩCT	0Ω	5-19847				Channel 7
G	Ant. Coil	0ΩCT	0Ω	5-19848				Channel 8
H	Ant. Coil	0ΩCT	0Ω	5-19849				Channel 9
I	Ant. Coil	0ΩCT	0Ω	5-19850				Channel 10
J	Ant. Coil	0ΩCT	0Ω	5-19851				Channel 11
K	Ant. Coil	0ΩCT	0Ω	5-19852				Channel 12
L	Ant. Coil	0ΩCT	0Ω	5-19853				Channel 13
L1B	Mixer Coil	0Ω		5-19859				Channel 9
I	RF, Mixer Grid & Osc. Coils	0Ω		5-19870				Channel 10
J	RF, Mixer Grid & Osc. Coils	0Ω		5-19871				Channel 11
K	RF, Mixer Grid & Osc. Coils	0Ω		5-19872				Channel 12
L	RF, Mixer Grid & Osc. Coils	0Ω		5-19873				Channel 13
L6	Mixer Coil	0Ω		126-764				
L7	Mixer Grid Coil	0Ω		20-538				
L8	Osc. Coil	0Ω		20-541				
L9	IF Coil	.4Ω		S-18859				
L10	Cone Plate	.1Ω		S-20902				Tapped at 5Ω
L11	47.25MC trap	0Ω		S-21718	17-4502*		6226	
L12	39.75MC trap	0Ω		S-21719	17-4501*		6226	
L13	1st Video IF	.1Ω		S-21019			6232	Includes 4L 25MC trap
L14	2nd Video IF	.1Ω	.1Ω	S-17907			6232	
L15	3rd Video IF	.1Ω	.1Ω	S-19952			6233	
L16	4th Video IF	.1Ω		S-20823			6233	
L17	Series Peaking Coil	5.5Ω		S-17913	19-3160	TV-184	4644	145 Microhenries
L18	Shunt Peaking Coil	5.5Ω		S-21562	19-3160	TV-184	4644	160 Microhenries, Wound to series with 270Ω resistor
L19	Series Peaking Coil	.9Ω		S-21688	19-1004		4650	8.7 Microhenries
L20	4.5MC trap	13Ω	1.5Ω	S-21492				
L21	Series Peaking Coil	5.3Ω		S-21562	19-3159†		8153†	136 Microhenries, Wound on 5.6KΩ resistor
L22	Sound IF	.3Ω	.3Ω	S-20219	18-3445			
L23	Quadrature Coil	4.8Ω		S-19080	20-1004■	TV-18L■	1470■	
L24	Horiz. Osc.	153Ω		S-19743	19-1577			Tapped at 63Ω
L25	RF Choke	9Ω		20-528				5.5 Microhenries
L26	RF Choke	0Ω		20-528				5.5 Microhenries

* Use trap with tuning screw.
■ Deluxe trap.
▲ Series with a 5.6KΩ resistor.
† Parallel with a 5.6KΩ resistor.
= Drill mounting hole.

ZENITH MODELS R2337 E, EU, R, RU, R2359E, EU, R, RU, R2360R, RU, R2362R, RU, R2367E, EU, Y, YU, R2387R, RU, R2391E, EU (Ch. 22B20, U)

PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	ZENITH PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L27	.380A	46.5Ω	2.74HY	95-1399					

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			ZENITH PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	1/4A 125V	136-22	83-1883	313.250 (3AG-S/B-1/4A)	357001	MDL 1/4	4405

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		ZENITH PART No.	SYLVANIA PART No.		
M2	CK706A	103-1	1N60 or 1N132		Video Det.

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M3	Pilot Light	100-66	Type PR12 - Used in chassis 22R20 only.
M4	Pilot Light	100-67	UHF Position of Turret - Chassis 22R20U
M5	Pilot Light	100-67	All Positions of Turret - Chassis 22R20U
M6A	Tuner	S-21735	VHF-UHF (For UHF Provision, use UHF Strips) Chassis 22R20
B	Tuner	S-21700	VHF - Chassis 22R20U
M7	Tuner	S-21864	UHF - Chassis 22R20U
M8	Trap		VHF Ant. Input Filter
M9	Video Det. Ass'y.	S-21686	Includes M2, C40, C41, L17 and L18
M10	Switch	85-546	VHF-UHF - Used in Chassis 22R20U
M11	Switch	S-21831	TV-Phono-Slide
M12	Integrator	87-1	Vertical
M13	Focus Magnet	S-20377	Includes Centering Device
M14	Ion Trap	S-17461	
M15	Correction Magnet	S-18763	
M16	Correction Magnet	S-18763	
B1	Trimmer Cap.	22-2398	Horiz. Drive
	Cabinet	14-1762E	Models R2337E, EU
	Cabinet	14-1762R	Models R2337R, RU
	Cabinet	14-1743E	Models R2359E, EU
	Cabinet	14-1743R	Models R2359R, RU
	Cabinet	14-1752R	Models R2360R, RU
	Cabinet	14-1755E	Models R2367E, EU
	Cabinet	14-1755Y	Models R2367Y, YU
	Cabinet	14-1747R	Models R2368R, RU
	Cabinet	14-1760R	Models R2387R, RU
	Cabinet	14-1761E	Models R2391E, EU
	Knob Assembly	S-21883	VHF Channel Selector - All Models
	Knob	46-1018	Tone (Bass) - All Models
	Knob	46-1055	Tone (Treble) - All Models
	Knob	46-1118	Horiz. Hold - All Models
	Knob	46-1182	Vert. Hold & Brightness - Models R2237E, R, EU, RU; R2360R, RU; R2367E, Y, EU, YU; R2368R, RU; R2387R, RU;and R2391E, EU.
	Knob	46-1005	Vert. Hold & Brightness - Models R2359E, R, EU, RU.
	Knob	46-1199	Contrast - All Models
	Knob	46-1335	On-Off-Volume - All Models
	Knob	S-22048	Dial (UHF) - Models R2337EU, RU; R2360RU; R2367EU, YU; R2387RU; R2391EU and R2368RU
	Knob	S-22025	Dial (UHF) - Models R2359EU, RU
	Knob	S-22024	Tuning (UHF) - All UHF Models
	Knob	46-1355	Fine Tuning - All Models
	Safety Glass	192-190	Models R2337E, R, EU, RU; R2360R, RU; R2367E, Y, EU, YU; R2368R, RU; R2387R, RU and R2391E, EU.
	Safety Glass	192-189	Models R2359E, R, EU, RU.
	Mask	196-257	Models R2337E, R, EU, RU; R2360R, RU; R2367E, Y, EU, YU; R2368R, RU; R2387R, RU.
	Mask	196-256	Models R2359E, R, EU, RU.
	Mask	196-253	Models R2391E, EU.

CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

TROUBLE SHOOTING AIDS (cont)

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V15, V16, V17, V18 and V19. Check M1 fuse. Check waveform W15.

If Satisfactory	If Unsatisfactory
Check T2, T4A, T5, T6, C91, C92, C90, R111, R112 and other associated components.	Check L24, C86, C85, C84, C87, C89, R101, R106, R104 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V16, V17, V18, V20 and V21. Check C89, R111, R112 and other associated components. Check adjustments B1 and B3.

BLOOMING

Check by substitution V17, V18, V19, V20 and V21. Check R111, R112, C89, C93 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5, V6 and V7. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

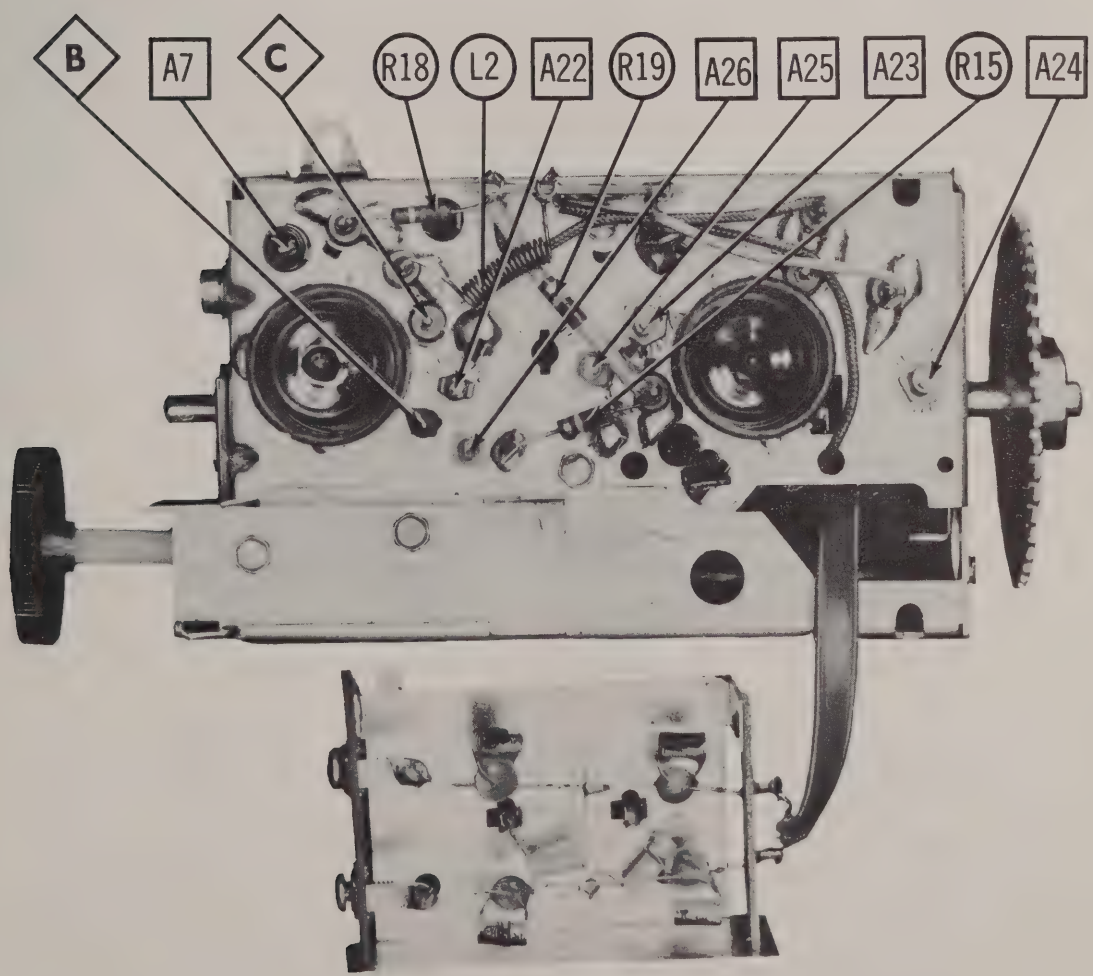
KEYSTONE EFFECT

Check T4 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



RF TUNER TOP VIEW

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

For touch-up adjustment of the VHF tuner oscillator circuit, it is necessary to remove rear cover and supply power to set. Adjustments are made thru the hole marked "Bull's Eye Adjustment" and are accessible one at a time as the selector switch is turned to each channel. (Fine tuning control must be set to the center of its range before making adjustments). Use Zenith alignment wrench part #68-21 for adjustment).

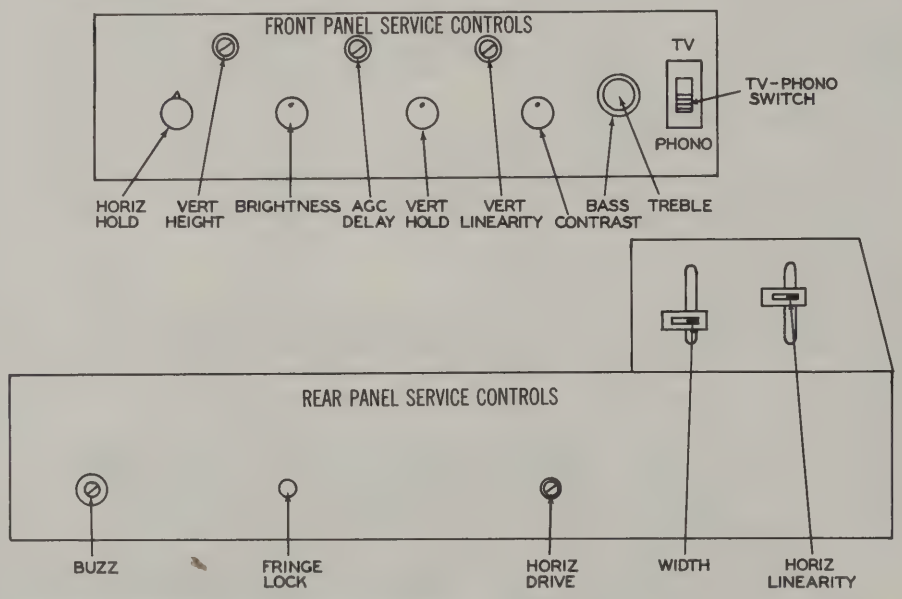
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 2 push-on type control knobs (channel selector and on-off volume). Remove 1 metal screw from each escutcheon panel. Remove escutcheon. Remove 2 wood screws from each safety glass clamp. Remove clamps. Let safety glass fall forward and lift out of slot at the bottom. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to reomve chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



SPECIAL ADJUSTMENTS - AGC DELAY ADJUSTMENT

Turn the set on and tune in a TV signal and observe the picture. Starting from the full clockwise position turn the AGC delay control counter clockwise slowly until picture distorts and buzz is heard in the sound. Then turn control clockwise for clearest picture and best sound.

FRINGE LOCK ADJUSTMENT

Turn the fringe lock control to 1/4 turn from full clockwise position. Adjust the vertical and horizontal hold for picture synchronization and check stability by switching off channel and back again.

SLIGHTLY retouch the fringe lock control adjustment, if necessary for maximum stability while testing as above.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the front panel service control. Adjust the horizontal hold control (L24) until picture synchronizes horizontally. If results cannot be obtained see horizontal sweep circuit adjustments on page 11.

SOUND IF DETECTOR BUZZ ADJUSTMENT

Adjust the buzz control located on the rear apron of the chassis for maximum volume and minimum buzz. If results are unsatisfactory see alignment instructions on pages 6 and 7.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

ANTI-PIN CUSHION ADJUSTMENT

Reduce the picture size so that the sides of the raster are visible, and position the magnets so that all sides are straight lines and the corners are at right angles.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove channel selector knob.
2. Remove 6 push-on type control knobs from under front control door.
3. Remove 8 wood screws. Remove fine tuning knob . Remove rear cover.
4. Remove shielded lead from tuner.
5. Remove volume control plug from chassis.
6. Remove 2 metal screws from rear of cabinet (holding tuner to cabinet) lower rear of tuner and pull out.
7. Disconnect B+ supply leads from tuner.
8. Disconnect 2 speaker leads.
9. Remove 4 chassis bolts. Remove chassis.

VOLUME CONTROL ASSEMBLY REMOVAL

1. Remove push-on type control knob.
2. Remove 1 metal screw from escutcheon panel. Remove panel.
3. Remove 1 control nut (outside cabinet).
4. Remove 1 metal screw from lead clamp (inside cabinet).
5. Remove lead clamp and control.

SPEAKER REMOVAL

1. Remove 6 speaker nuts from 2 speakers. Remove 2 speakers.

PHOTOFACT* Folder

*TRADE MARK

RETMA MEMBER

ZENITH MODELS R2237 E, EU, R, RU, R2359E, EU, R, RU, R2360R, RU, R2368R, RU, R2367E, EU, Y, YU, R2387R, RU, R2391E, EU (Ch. 22R20, U)

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MODEL R2359R

ZENITH MODELS R2237 E, EU, R, RU, R2359E, EU, R, RU, R2360R, RU, R2368R, RU, R2367E, EU, Y, YU, R2387R, RU, R2391E, EU (Ch. 22R20, U)

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DATE 5-55 SET 276 FOLDER 10

PHOTOFACT* Folder
*TRADE MARK

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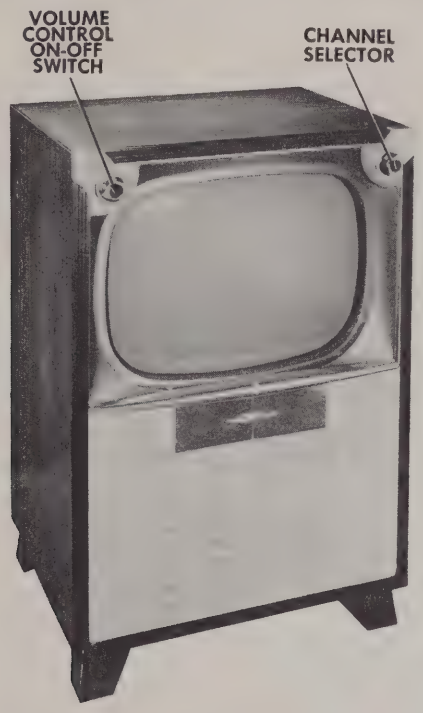

ZENITH MODEL R2359R

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

TRADE NAME	ZENITH	MODELS	CHASSIS
		R2337E, R2337R, R2359E, R2359R, R2360R, R2367E, R2367Y, R2368R	22R20
		R2387R, R2391E	22R20 & Radio Ch. 10L20
		R2337EU, R2337RU, R2359EU, R2359RU, R2360RU, R2367EU, R2367YU, R2368RU	22R20U
		R2387RU, R2391EU	22R20U & Radio Ch. 10L20

MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois
TYPE SET	Television Receiver
TUBES	Twenty
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 2.16 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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FOR SERVICE INFORMATION ON RADIO CHASSIS 10L20, SEE PHOTOFACT SET 233, FOLDER 13

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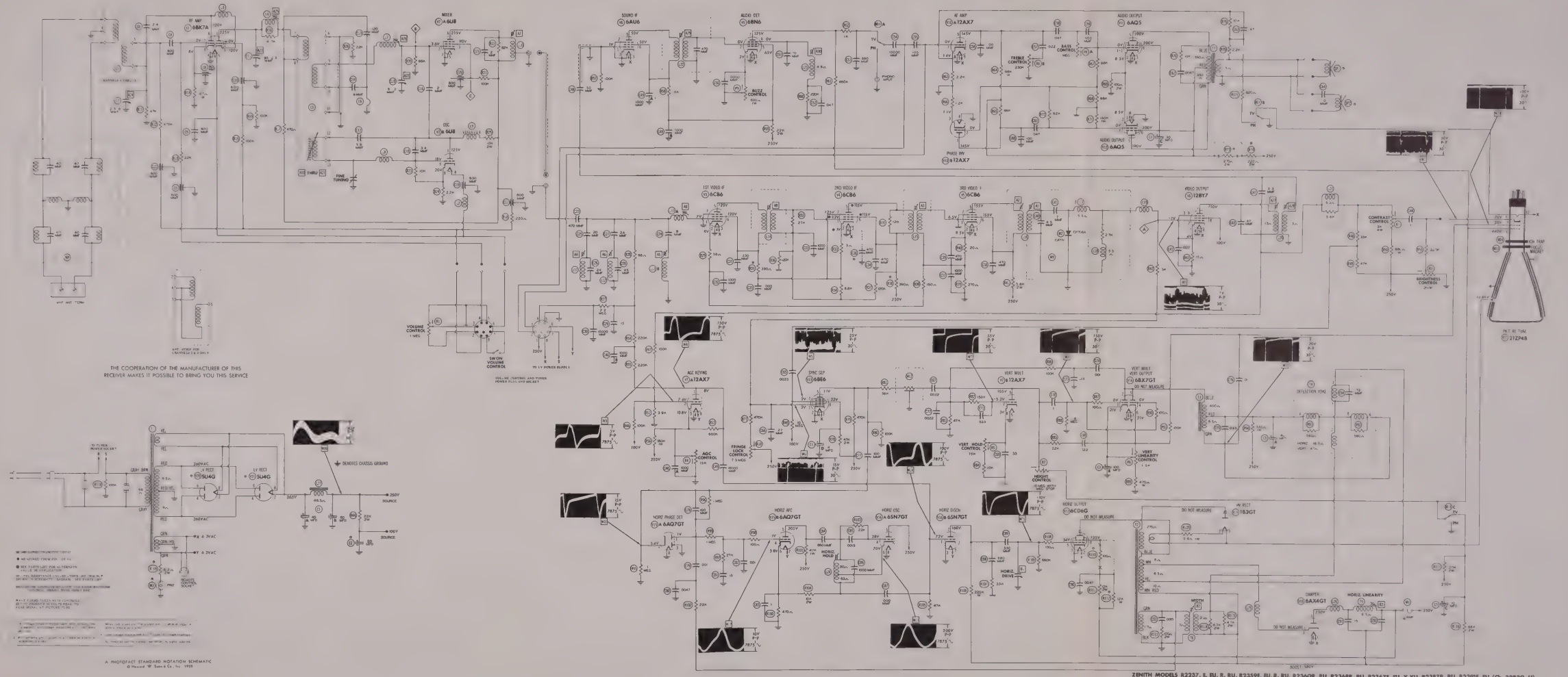
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
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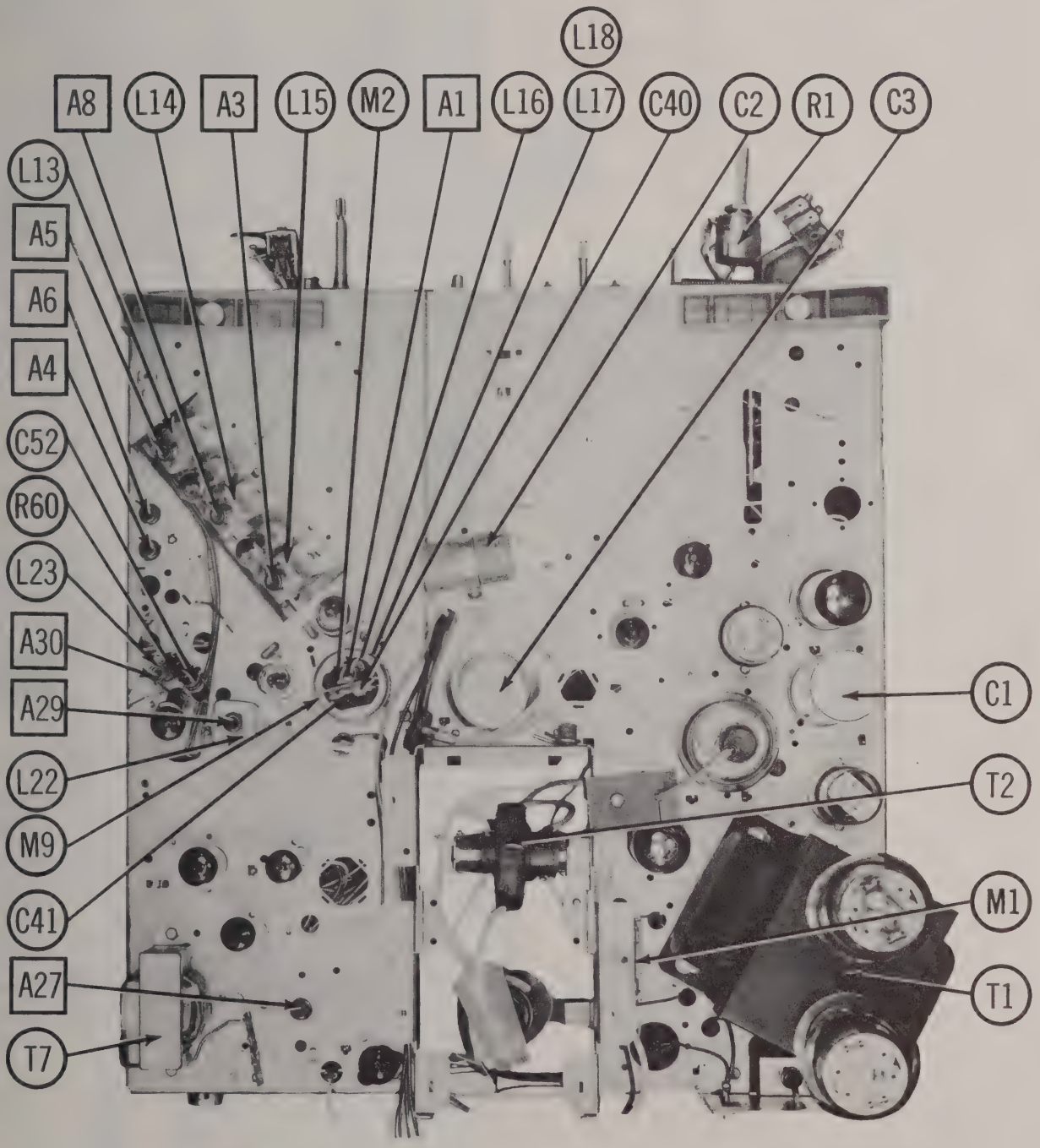
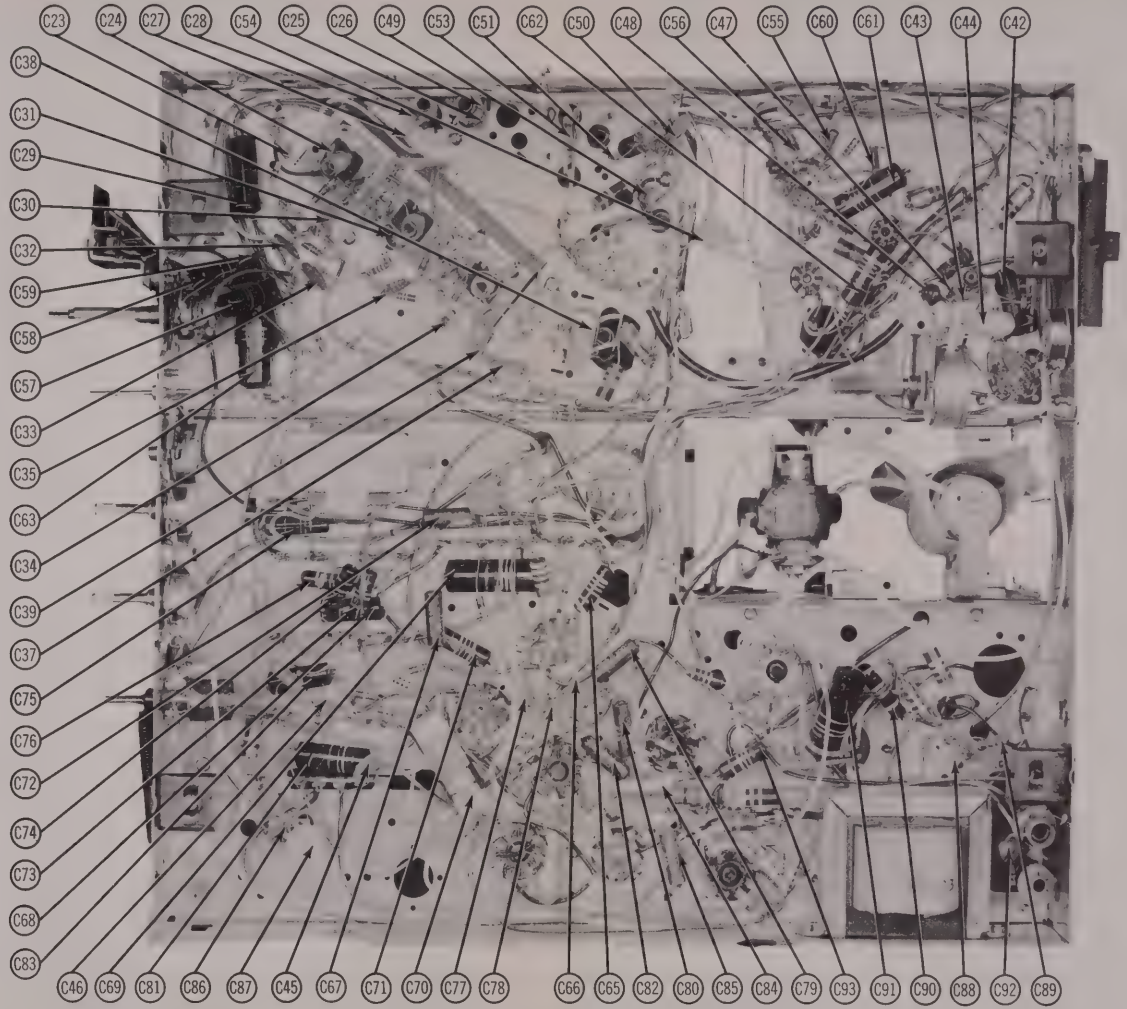


CHASSIS TOP VIEW

SET 276 FOLDER 10



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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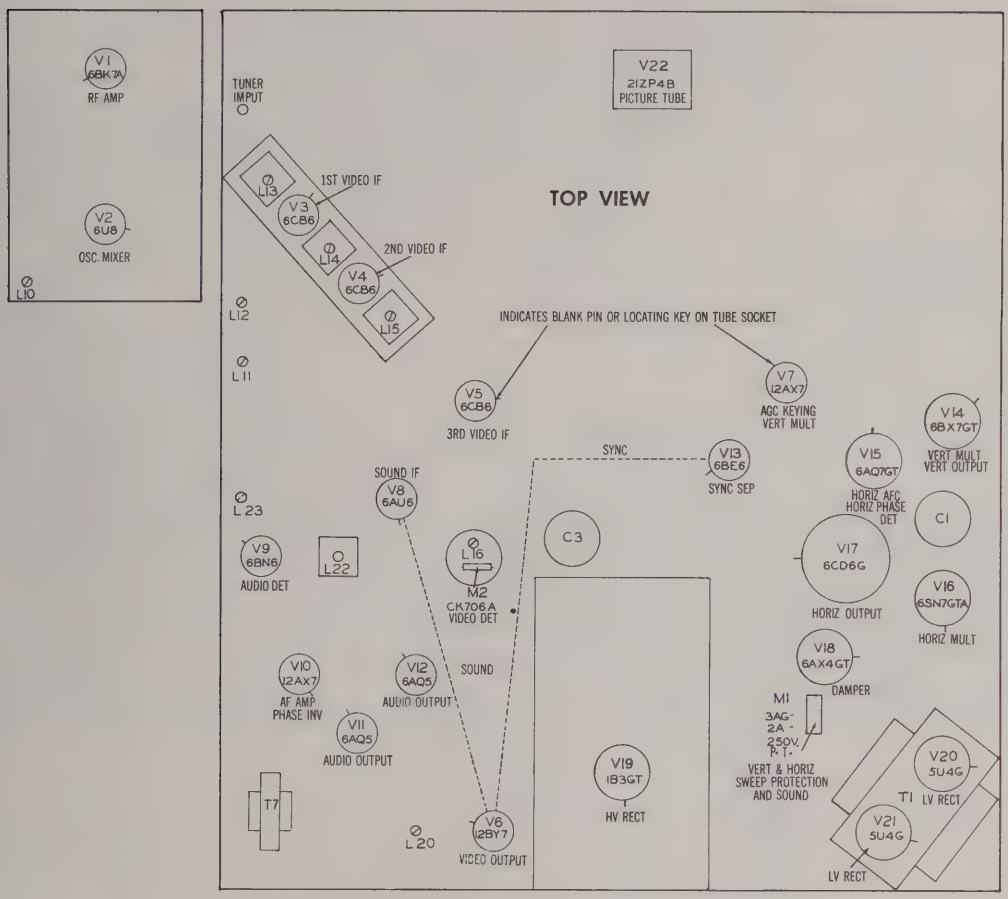
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V20, V21**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V7, V22**
Has pic, no sound - **V8, V9, V10, V11, V12**
Overloaded picture - **V7**

SYNC FAILURE
No vert. sync - **V7, V13, V14**
No horiz. sync - **V13, V15, V16**
No vert. or horiz. sync - **V13**

SWEEP FAILURE
No raster, has sound - **V16, V17, V18, V19, V22, Fuse (M1)**
No vertical deflection - **V7, V14**
Poor vert. linearity or foldover - **V7, V14**
Poor horiz. linearity or foldover - **V16, V17, V18**
Narrow picture - **V16, V17, V18, V19, V20, V21**
Vert. off freq. - **V7, V13, V14**
Horiz. off freq. - **V13, V15, V16**

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ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Picture tube may be removed from chassis for easier slug adjustment.

VIDEO IF ALIGNMENT

Connect the negative lead of a 2 volt battery to the ungrounded side of C29. Connect the positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	470MFD	High side to pin 1 (grid) of V5. Low side to chassis.	44MC (10MC Swp)	45.75MC 39.75MC 44.0MC	Any non-interfering channel	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A1, A2	Adjust A1 and A2 for maximum gain. Place marker 45.75MC and 39.75MC for correct position as on response curve (Fig. 1). If the response curve cannot be obtained check position of slugs. Be sure they are away from the center of the coils.
2.	"	High side to pin 1 (grid) of V4. Low side to chassis.	"	44MC	"	"	A3	Adjust for response similar to Fig. 2.
3.	"	High side to point Ⓑ. Low side to chassis.	"	47.25MC 41.25MC 39.75MC	"	"	A4, A5, A6	Remove the bias battery. Adjust scope gain to amplify the trap region of the response curve. Adjust for minimum marker amplitude. Adjust for response similar to Fig. 3. With maximum scope gain top of response curve may not be shown on scope.
4.	"	"	"	42.75MC 45.0MC 45.75MC	"	"	A7, A8, A9	Replace bias battery at -2 volts. Adjust for response curve similar to Fig. 4. If necessary retouch A3 for desired response. Do not readjust A1 and A2 in this step.

OSCILLATOR ALIGNMENT

The master oscillator adjustment (L8) is to be made only if the adjustment of the individual channel oscillator adjustments fail to bring the channels within the range of the fine tuning control. If channels 2 thru 6 fall within the range of the fine tuning control but the higher ones do not, slightly readjust L8 to bring in the higher channels. If channels 2 thru 6 do not fall within tuning range, readjust the bull's-eye adjustment on rear of tuner.
Connect the negative lead of a 1 volt bias to the ungrounded side of C29. Positive lead to chassis.
Turn the oscilloscope gain up so that the sound trap notch in the response curve becomes visible.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	57MC (10MC Swp)	59.75MC	2	Vert. Amp. to point Ⓐ. Low side to chassis.	A10	Adjust to place sound marker in notch as in Fig. 5.
			63MC (10MC Swp)	65.75MC	3		A11	
			69MC (10MC Swp)	71.75MC	4		A12	
			79MC (10MC Swp)	81.75MC	5		A13	
			85MC (10MC Swp)	87.75MC	6		A14	
			177MC (10MC Swp)	179.75MC	7		A15	
			183MC (10MC Swp)	185.75MC	8		A16	
			189MC (10MC Swp)	191.75MC	9		A17	
			195MC (10MC Swp)	197.75MC	10		A18	
			201MC (10MC Swp)	203.75MC	11		A19	
			207MC (10MC Swp)	209.75MC	12		A20	
			213MC (10MC Swp)	215.75MC	13		A21	

RF & MIXER ALIGNMENT

Leave the bias battery connected as under "Oscillator Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	63MC (10MC Swp)	61.25MC 65.75MC	3	Vert. Amp. thru 10KΩ to point Ⓒ. Low side to chassis.	A22, A23, A24	Adjust for response similar to Fig. 6.
7.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"	A25, A26	Adjust for symmetry of response curve (Fig. 7).

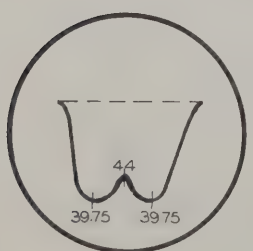

FIG. 1

FIG. 2

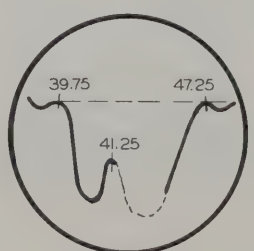

FIG. 3

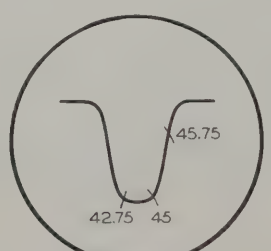

FIG. 4

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ALIGNMENT INSTRUCTIONS (cont)

SOUND IF ALIGNMENT

Connect an attenuator (Zenith part #S-17203 or equivalent) in series with the receiver antenna.
Tune in a tone modulated TV signal and adjust the attenuator until the signal falls below the limiting level of the (6BN6) audio detector, as evidenced by a hiss similar to super-regeneration.
Adjust the sound take-off transformer (A27 and A28), the sound IF coil (A29) the quadrature coil (A30) for maximum sound of best quality.
Adjust the buzz control (R9) for minimum intercarrier buzz.
If the intercarrier buzz cannot be eliminated with the buzz control, check the AGC delay setting.
If during the sound IF alignment the signal rises above the limiting level (hiss disappears) increase the attenuation until the hiss returns.

UHF TUNER ALIGNMENT

Alignment of the UHF tuner should not be attempted unless proper test equipment is available.
Switch receiver to UHF position.
Leave bias supply connected as under "Video IF Alignment" and adjust for -2 volts.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Fig. 9	Across UHF antenna terminals thru matching network (Fig. 9)	713MC (10MC Swp)	711.25MC	54	Vert. thru 10KΩ to point (A). Low side to chassis.	A31	Tuner rocker arm should be in the horizontal position. If necessary, loosen the set screw and adjust tuner shaft so that rocker arm is horizontal with indicator set to channel 54. Do not adjust A31 unless oscillator calibration is off more than 3 channels. If necessary, adjust A31 for response similar to Fig. 8 with video marker at 50%. The image (weaker response) will appear, also. The response toward the counter clockwise position of A31 is the correct response.
9.	"	"	"	"	"	"	A32, A33	Adjust for maximum amplitude and symmetry of response similar to Fig. 8.
10.	"	"	473MC (10MC Swp)	471.25MC	14	"		Check for response similar to Fig. 8. If oscillator is off more than 3 channels, adjust the oscillator travel adjustment (Osc., mixer and ant. travel adjustments are the 3 round thump screws on top of the tuner) to scale. Care must be used in making these adjustments so as not to move the rocker arm out of its bearing. Set the mixer and antenna travel adjustments for maximum response on scope.
11.	"	"	887MC (10MC Swp)	885.25MC	83	"	A34, A35 A36	Adjust A34 to place video marker at 50% on response curve as in Fig. 8. Adjust A35 and A36 for maximum amplitude and symmetrical response.

FIG. 5

FIG. 6

FIG. 7

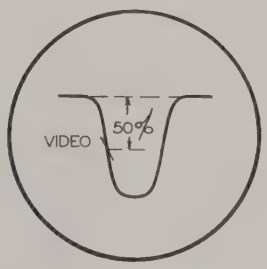


FIG. 8

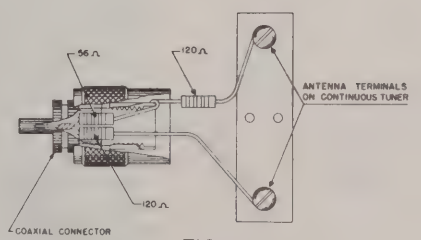
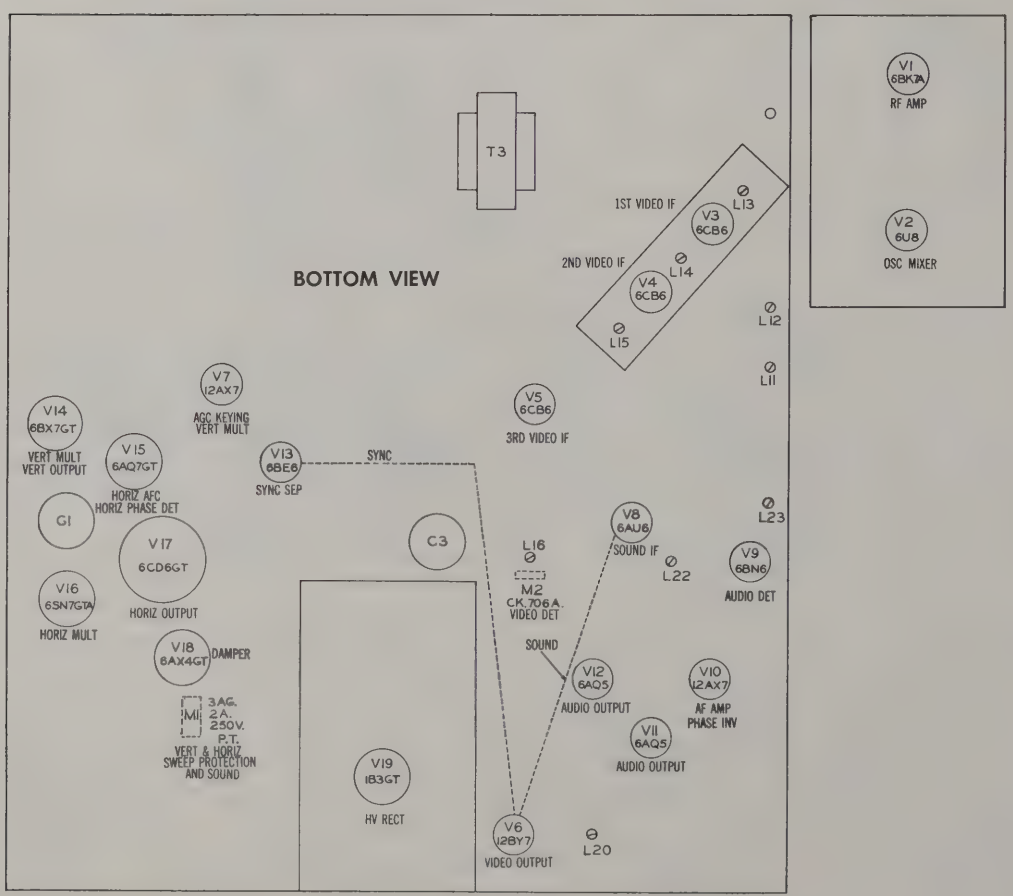


FIG. 9

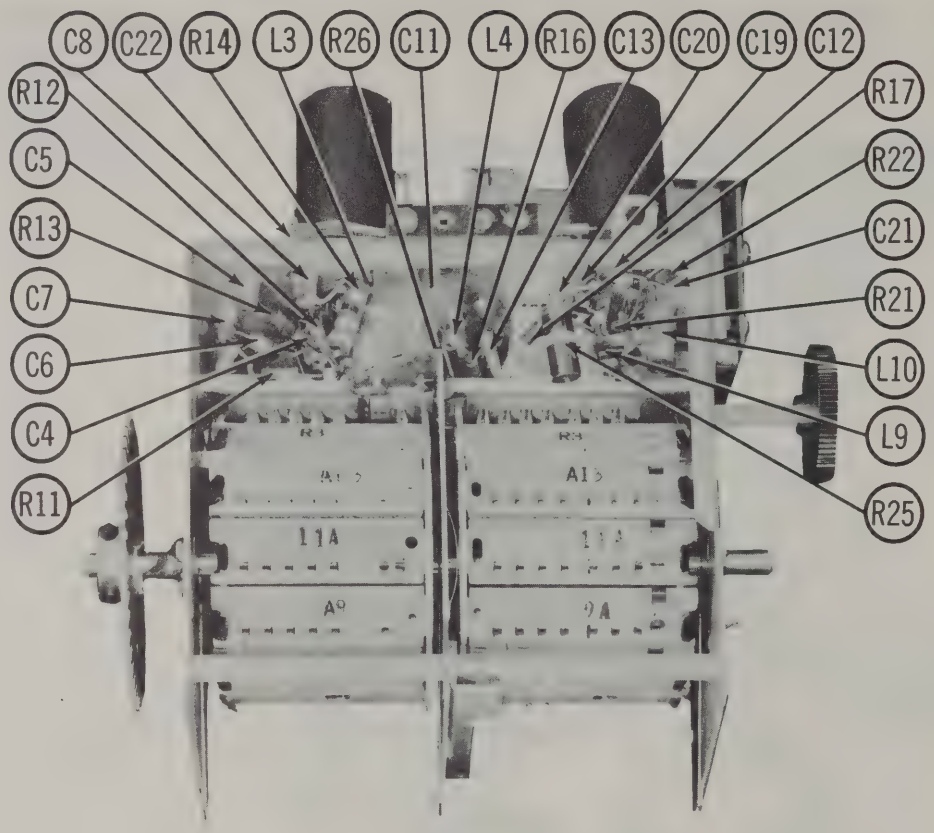
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BK7A	†750Ω	†50KΩ	INF	0Ω	.1Ω	INF	3Meg	47Ω	0Ω
V 2	6U8	†10.3KΩ	68KΩ	†100KΩ	.1Ω	0Ω	†300Ω	0Ω	2.2KΩ	12.2KΩ
V 3	6CB6	1.2Meg	500Ω	.1Ω	0Ω	■400Ω	■400Ω	0Ω		
V 4	6CB6	70KΩ	■15Ω	.1Ω	0Ω	†450Ω	†450Ω	70KΩ		
V 5	6CB6	270Ω	400Ω	.1Ω	0Ω	†5.6KΩ	†5.6KΩ	0Ω		
V 6	12BY7	15Ω	3KΩ	15Ω	0Ω	0Ω	.1Ω	†5.5KΩ	†22KΩ	15Ω
V 7	12AX7	680KΩ	3.9KΩ	9.5KΩ	0Ω	0Ω	▲6Meg	200KΩ	45KΩ	.1Ω
V 8	6AU6	100KΩ	0Ω	.1Ω	0Ω	†32KΩ	†32KΩ	0Ω		
V 9	6BN6	400Ω	.3Ω	.1Ω	0Ω	†22KΩ	220KΩ	▲750KΩ		
V 10	12AX7	†68KΩ	60KΩ	1.2KΩ	0Ω	0Ω	†68KΩ	130KΩ	2.2KΩ	.1Ω
V 11	6AQ5	130KΩ	100Ω	.1Ω	0Ω	†850Ω	†500Ω	130KΩ		
V 12	6AQ5	80KΩ	100Ω	.1Ω	0Ω	†850Ω	†500Ω	80KΩ		
V 13	6BE6	18KΩ	0Ω	.1Ω	0Ω	†100KΩ	†47KΩ	10Meg		
V 14	6BX7GT	1.8Meg	†780Ω	900Ω	1.8Meg	†780Ω	900Ω	.1Ω	0Ω	
V 15	6AQ7GT	2Meg	1Meg	0Ω	3Meg	†47KΩ	470Ω	.1Ω	0Ω	
V 16	6SN7GT	47KΩ	▲220KΩ	0Ω	33KΩ	†50Ω	10.5KΩ	.1Ω	0Ω	
V 17	6CD6G	INF	.1Ω	0Ω	680KΩ	680KΩ	†6KΩ	0Ω	†6KΩ	Top Cap ▲8Ω
V 18	6AX4GT	17Ω	INF	220KΩ	220KΩ	†65Ω	†65Ω	.1Ω	0Ω	
V 19	1B3GT		PINS	1 - 8	HAVE	INFINITE	RESISTANCE			▲278Ω
V 20	5U4G	INF	30KΩ	INF	10Ω	INF	9Ω	INF	30KΩ	
V 21	5U4G	INF	30KΩ	INF	10Ω	INF	9Ω	INF	30KΩ	
V 22	21ZP4B	0Ω	100KΩ	Pin 10 ▲68KΩ	Pin 11 †280KΩ	Pin 12 .1Ω				

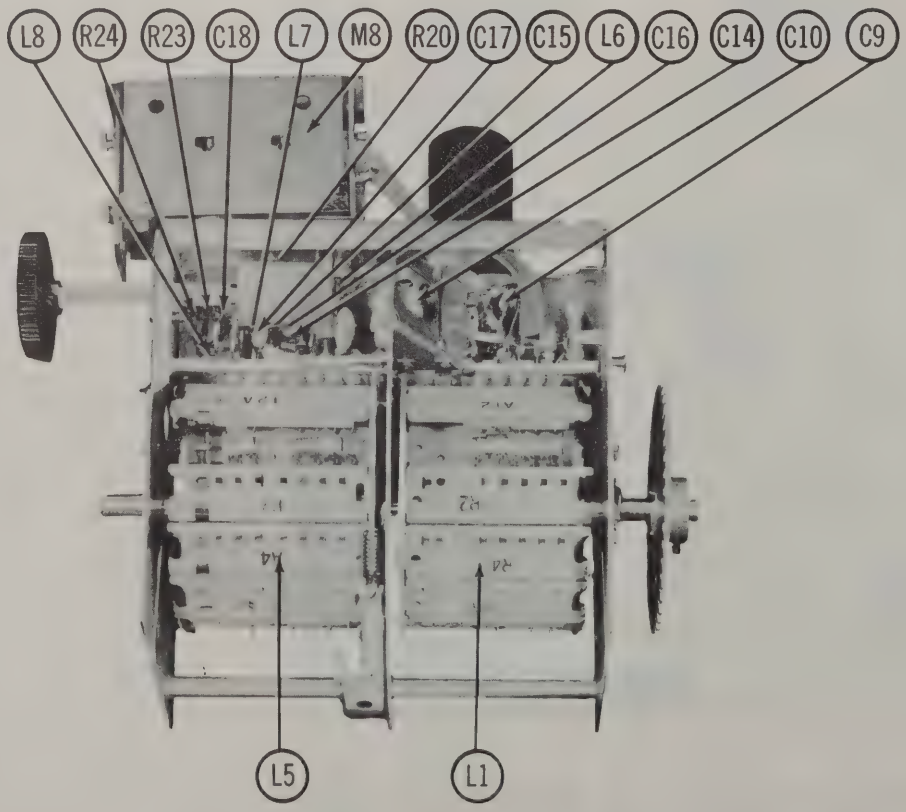
† MEASURED FROM PIN 2 OF V21.
■ MEASURED FROM PIN 7 OF V4.
▲ MEASURED FROM PIN 3 OF V18.



TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE

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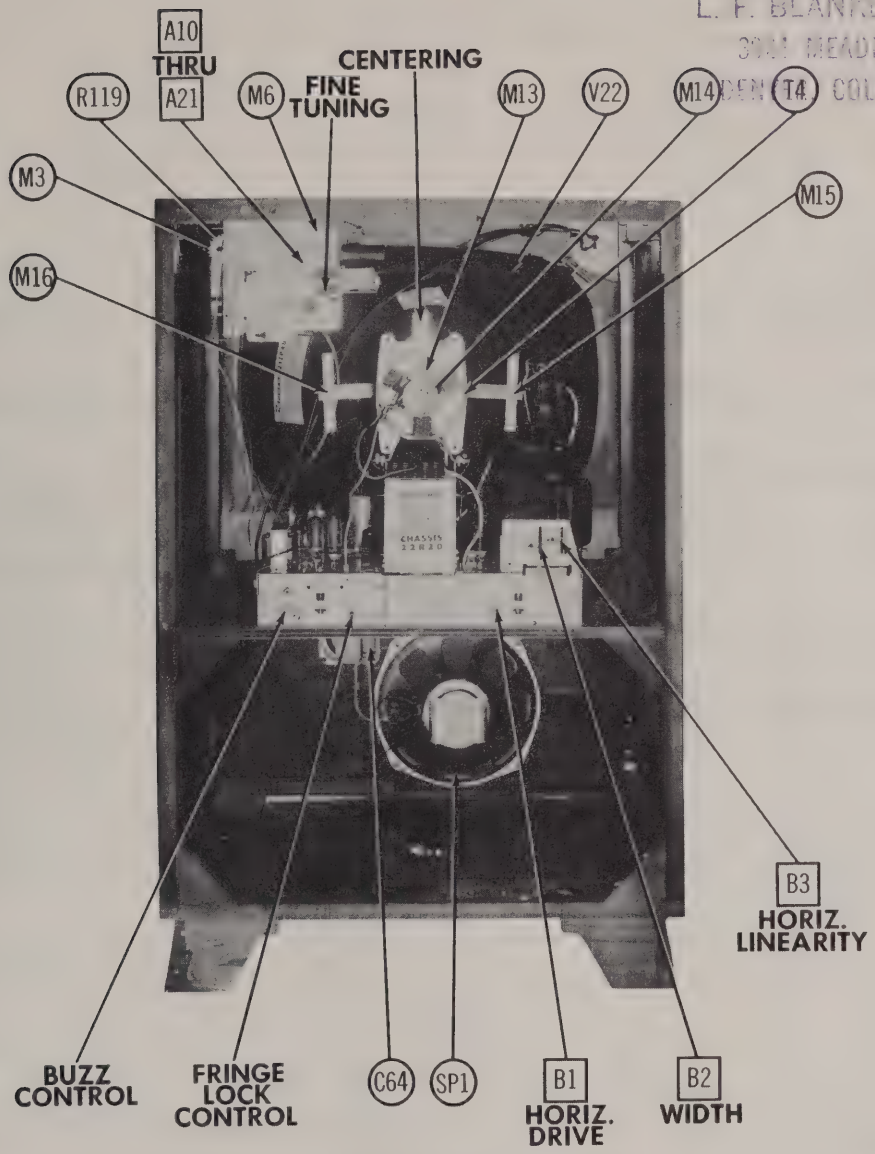


CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Adjust the horizontal hold (L24) located on front of chassis until picture synchronizes horizontally.

Adjust the horizontal drive trimmer (B1) for greatest width.

Adjust the width slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B3) for a picture that is symmetrical from left to right.

AGC DELAY CONTROL ADJUSTMENT

Connect the vertical amplifier of an oscilloscope thru 10KΩ to point (A). Select the strongest signal being received and adjust the delay control for 2 volts peak output.

ZENITH MODELS R2237 E, EU, R, RU, R2359E, EU, R, RU, R2360R, RU, R2368R, RU, R2367E, EU, Y, YU, R2387R, RU, R2391E, EU (Ch. 22R2O, U)

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V16, V17, V18, V20 and V21. Check adjustments B1, B2 and B3. Check T2, T4A, C89, R111, R112 and other associated components.

DRIVE LINES

Check by substitution V16, V17 and V18. Check adjustments B1 and B3. Check C89, R111, R112, R114, R115 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V17 and V18. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V15, V16, V17 and V18. Check C82 for open. Check L24, R101, R100, C86 and other associated components.

XMAS TREE EFFECT

Check by substitution V15, V16, V17 and V18. Check T2 and T4 for internal arcing. Check C79, C80, C83, C86, L24 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V7 and V14. Check waveform W8.

If Satisfactory	If Unsatisfactory
Check T3, T4B, R94, R89, C3A and other associated components.	Check R2, R117, C67, C70 and other associated components.

INSUFFICIENT SWEEP

Check by substitution V7 and V14. Check vertical size and vertical linearity controls for proper operation. Check T3, T4B, R2, R116 and other associated components.

COMPRESSED AT BOTTOM

Check by substitution V7 and V14. Check R2, R116, C70, C71 and other associated components.

COMPRESSED AT TOP

Check by substitution V7 and V14. Check R89, R6, C3B, C70, T3 and other associated components.

FOLDS

Check by substitution V7 and V14. Check R85, R89, R6, C68, C3B and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Substitute V13. Check C65, R44, R78, R79 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Substitute V7. Check C67, C69, M12, R84, R5 and other associated components.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V15 and V16. Check C77, C78, C79, C86, L24 and other associated components.

HORIZONTAL BENDING

Check by substitution V7, V13, V15 and V16. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Substitute V6. Check L19, L21, R50, R44, C44 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A27. Check video IF alignment.

POOR CONTRAST

Substitute V6. Check video crystal detector network. Check contrast control. Check L19, L21, C43, C44, R50 and other associated components.

NEGATIVE PICTURE

Substitute V6. Check picture tube. Check video crystal detector network. Check R43, L21, C44 and other associated components.

SMEAR

Substitute V6. Check L19, L21, C44 and R50. Check video IF alignment.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5, V6 and V7 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V8, V9, V10, V11 and V12. Check stages V10, V11 and V12 using audio signal generator. Apply audio signal across R1.

If Satisfactory	If Unsatisfactory
Check audio detector and audio IF stages for component failure or change of value.	Check C58, C56, C61, C62, C1C, R64, R67, R69, R73, R74, T7, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustments A30 and R9. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

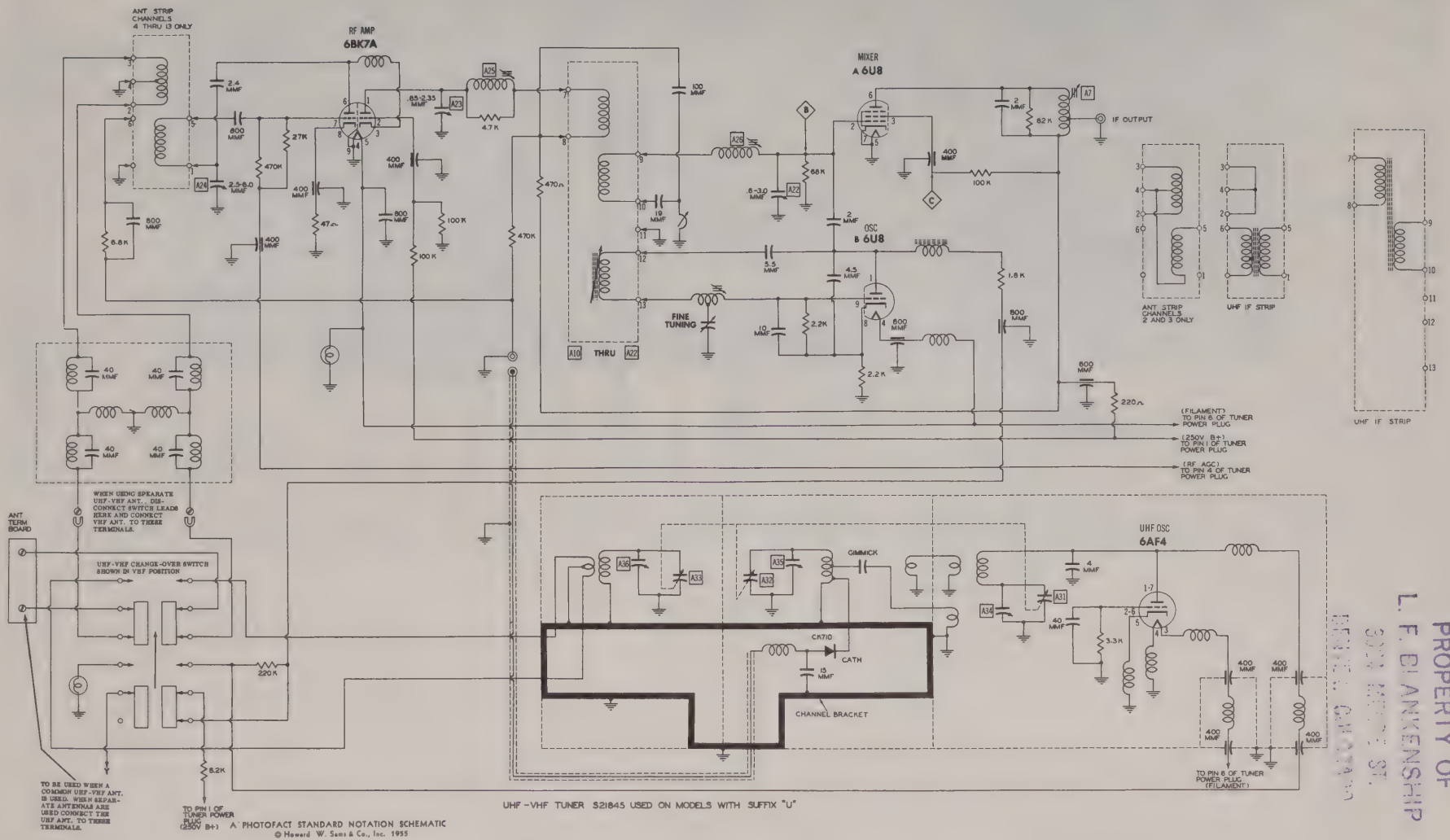
POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check tuner plug for good connections. Check switch on volume control and T1. If filaments light, check by substitution V20, V21 and V18. Check B+ filter and decoupling network. Check M1 fuse.

SMALL AND/OR DIM PICTURE

Check by substitution V20 and V21. Check B+ filter and decoupling network.


ANT STRIP CHANNELS 4 THRU 13 ONLY
RF AMP 6BK7A
MIXER A 6U8
OSC B 6U8
IF OUTPUT
ANT STRIP CHANNELS 2 AND 3 ONLY
UHF IF STRIP
FINE TUNING
A10 THRU A22
(FILAMENT) TO PIN 6 OF TUNER POWER PLUG
(250V B+) TO PIN 1 OF TUNER POWER PLUG
(RF AGC) TO PIN 4 OF TUNER POWER PLUG
UHF OSC 6AF4
GIMMICK
CK710
CATH
CHANNEL BRACKET
TO PIN 6 OF TUNER POWER PLUG (FILAMENT)
ANT TERM BOARD
UHF-VHF CHANGE-OVER SWITCH SHOWN IN VHF POSITION
WHEN USING SEPARATE UHF-VHF ANT., DISCONNECT SWITCH LEADS HERE AND CONNECT VHF ANT. TO THESE TERMINALS.
TO BE USED WHEN A COMMON UHF-VHF ANT. IS USED. WHEN SEPARATE ANTENNAS ARE USED CONNECT THE UHF ANT. TO THESE TERMINALS.
TO PIN 1 OF TUNER POWER PLUG (250V B+)

UHF-VHF TUNER S21845 USED ON MODELS WITH SUFFIX "U"

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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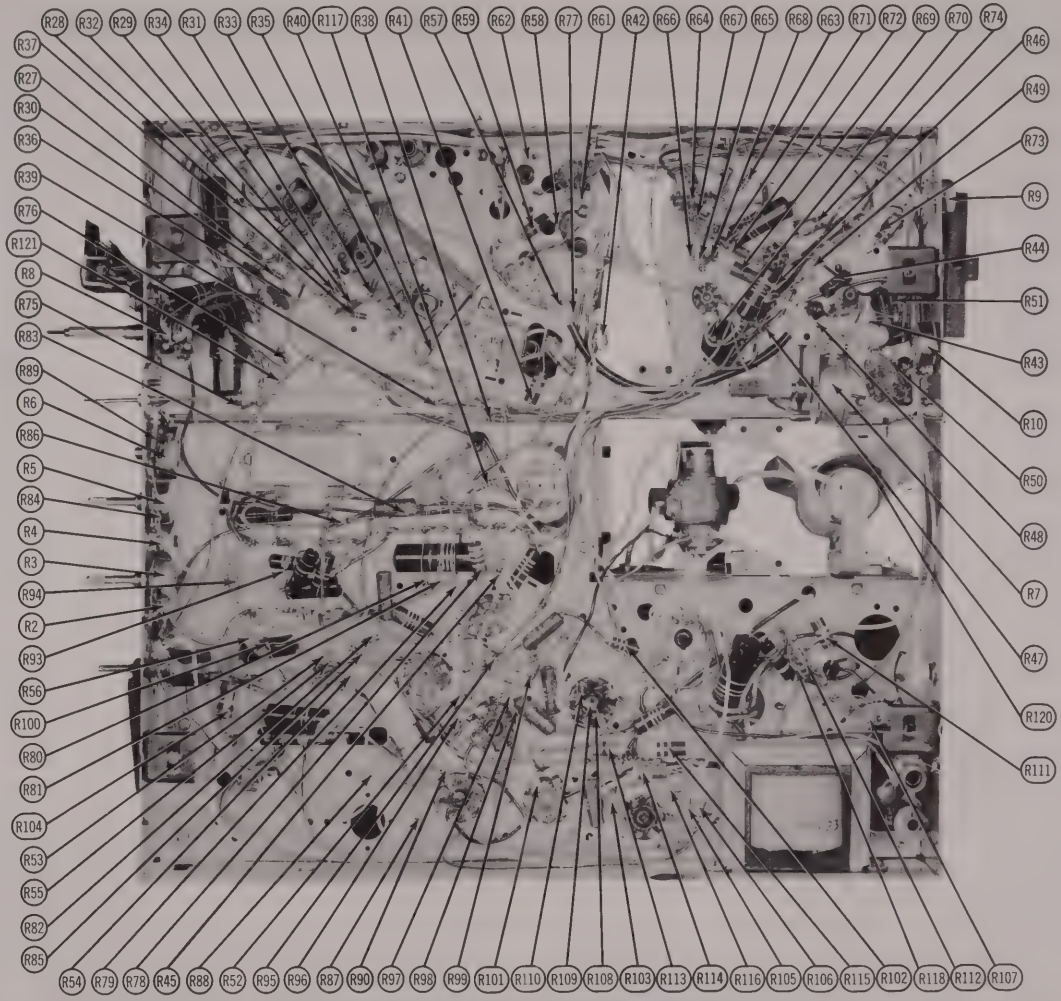
ALTERNATE TUNER SCHEMATIC

ZENITH MODELS R2237 E, EU, R, RU, R2359E, EU, R, RU, R2360R, RU, R2368R, RU, R2367E, EU, Y, YU, R2387R, RU, R2391E, EU (CH. 22R20, U)



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF

ZENITH MODELS R2337 E, EU, R, RU, R2359E, EU, R, RU, R2360R, RU, R2366R, RU, R2367E, EU, Y, YU, R23878, RU, R2391E, EU (CH. 2283D, U)

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BK7A	6BK7A	9AJ	
V2	Osc. - Mixer	6U8	6U8	9AE	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Output	12BY7	12BY7	9BF	
V7	AGC Keying - Vert. Mult.	12AX7	12AX7	9A	
V8	Sound IF Amp.	6AU6	6AU6	7BK	
V9	Audio Detector	6BN6	6BN6	7DF	
V10	AF Amp. - Phase Inverter	12AX7	12AX7	9A	
V11	Audio Output	6AQ5	6AQ5	7BZ	
V12	Audio Output	6AQ5	6AQ5	7BZ	
V13	Sync Separator	6BE6	6BE6	7CH	
V14	Vert. Mult. - Vert. Output	6BX7GT	6BX7GT	8BD	
V15	Horiz. AFC - Horiz. Phase Det.	6AQ7GT	6AQ7GT	6CK	
V16	Horiz. Osc. - Horiz. Discharge	6SN7GT	6SN7GT	8BD	
V17	Horiz. Output	6CD6G	6CD6G	5BT	
V18	Damper	6AX4GT	6AX4GT	4CG	
V19	HV Rectifier	1B3GT	1B3GT	3C	
V20	LV Rectifier	5U4G	5U4G	5T	5U4GA used as an alternate
V21	LV Rectifier	5U4G	5U4G	5T	5U4GA used as an alternate

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CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: ZENITH PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V22	21ZP4B ①	21ZP4B ① 21ZP4A	21ZP4B ① 21ZP4A	21ZP4B ① 21ZP4A 21ZP4 ②	21ZP4B ① 21ZP4A	12N 12N	① Aluminized ② Circuit changes necessary

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ZENITH PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1A	■40	400	22-2597			FP385.5		Q-065	
B	▲80	400				TC77		MT-4504	
C	▲30	400							
D	4	350							
C2	20	400	22-2389			TC75	TD-20-450	FM-4520	Note 1
C3A	▲40	400	22-2368			FP459		FM-4540	
B	▲100	50						T-810	
C	■10	475							
D	10	25							Note 2
C4	800		22-2331	DD-801	801-001	DC-521			
C5	800		22-2577						
C6	2.4		22-2596						
C7	2.5-6		22-2221						
C8	800		22-2577						
C9	800		22-2331	DD-801	801-001	DC-521			
C10	800		22-2577						
C11	.85-2.3		22-2453	829-3	3115-01-0R5	CT565A			
C12	800		22-2577						
C13	120		22-2591	D6-121	811-121	UC-5312			
C14	19		22-2406						
C15	.6-3		22-2504	829-3	3115-01-0R5	CT565A			
C16	2		22-2434						
C17	5.6		22-2499						
C18	3.4		22-2592						
C19	800		22-2577						
C20	800		22-2577						
C21	2		22-2585						
C22	800		22-2577						
C23	470		22-2214	D6-471	GP2K-471	UC-5347		K-1347	
C24	8		22-2481						
C25	20		22-2593	TCZ-20	NP0K-200	ZT-542			
C26	24		22-2515	TCZ-24	NP0L-240				
C27	24		22-2515	TCZ-24	NP0L-240				
C28	45		22-2600						
C29	.15	200	22-2147			PT4015	IMP2-P15	3302015	
C30	10000		22-3	DD-103	811-01	DC-511			
C31	330		22-2309	D6-331	GP2K-331	UC-5333		K-1333	
C32	1000		22-7	DD-102	801-001	DC-521		K-1210	
C33	1000		22-7	DD-102	801-001	DC-521		K-1210	
C34	470		22-2302	D6-471	GP2K-471	UC-5347		K-1347	
C35	1000		22-7	DD-102	801-001	DC-521		K-1210	
C36	470			D6-471	GP2K-471	UC-5347		K-1347	Note 2
C37	1000		22-2112	D6-1000	GP2L-102	UC-521		K-1210	
C38	470	500	22-2524	D6-471	GP2K-471	MC245		K-1347	
C39	470		22-2214	D6-471	GP2K-471	UC-5347		K-1347	
C40	4.5		22-2522						
C41	7		22-2375						
C42	.022	200	22-2071	DF-203	817-02	PT4122	IMP4-S22	3304122	
C43	47		22-2467						
C44	.1	200	22-1777	DF-104		PT401	IMP2-P1	330201	
C45	10000		22-3	DD-103	811-01	DC-511			
C46A	1000		22-2545	DD2-102	812-001	DCD-521		K-1210	
B	1000							K-1210	
C47	3.3		22-2343	TCZ-3.3	NP0A-3R3	ZT-5533			
C48	50		22-2480	D6-500	GP1K-500	UC-545		K-1450	
C49A	1000		22-2553	DD2-102	812-001	DCD-521		K-1210	
B	1000							K-1210	
C50	10000		22-3	DD-103	811-01	DC-511			
C51	10		22-2378		NP30K-100				
C52	.047	200	22-1778	DF-503		PT4147	IMP2-S47	3302147	

ZENITH MODELS R2237, E, EU, R, RU, R2359E, EU, R, RU, R2360R, RU, R2368R, RU, R2367E, EU, Y, YU, R2387R, RU, R2391E, EU (Ch. 22R20, U)

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PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP	RATING VOLT	ZENITH PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
			REPLACEMENT DATA						
C53	680		22-2370	DS-681	GP2K-681	UC-5368		K-1368	
C54	10000		22-3	DD-103	81J-01	DC-511			
C55	100		22-5	DS-101	GP1K-101	UC-531		K-1310	
C56	100		22-5	DS-101	GP1K-101	UC-531		K-1310	
C57	.022	600	22-1813	DF-303	617-S3	PT6123	IMP6-223	3306123	
C58	.047	600	22-1844	DF-503		PT6147	IMP6-347	3306147	
C59	1000		22-2598	DD-103	501-001	DC-521		K-1310	
C60	100		22-5	DS-101	GP1K-101	UC-531		K-1310	
C61	.047	600	22-1844	DF-503		PT6147	IMP6-347	3306147	
C62	.0047	1600	22-2564	DD16-472	1R5KV-472	PT16247	CT16-D47		
C63	.47	200	22-2165			PT4047	IMP2-P47	3302047	
C64	1.0	120	22-2469			PT41	P-41	330210	
C65	.0033	400	22-2631	DS-332	GP2-333-332	PT6233	IMP6-333	3306233	
C66	27		22-2396	TC2-27	MP0L-270				
C67	.0022	600	22-1803	DF-222	GP3-353-222	PT6222	IMP6-D22	3306222	
C68	.022	600	22-1813	DF-303	617-S2	PT6122	IMP6-S22	3306122	
C69	33	200	22-2159					3300033	
C70	.1	900	22-3061	DF-104		PT601	IMP6-P1	330601	
C71	.033	300	22-2510					CR-1325	
C72	.0033	300	22-2181					KR-1310	
C73	.001	600	22-2138			MC8255		KR-1310	
C74	.001	600	22-2138			MC8255		KR-1310	
C75	.033	200	22-1778			PT4133	IMP6-S3	3306133	
C76	.01	400	22-1646	DS-103	GP2-333-103	PT401	IMP4-S1	330401	
C77	100	500	22-1442			MC8255		KR-1310	
C78	120	500	22-2505					KR-1312	
C79	.001	300	22-1839	DS-102	GP2L-102	PT621	IMP6-D1	330621	
C80	.0047	200	22-1843			MC8465		CR-1347	
C81	.15	200	22-2166						
C82	.001	200	22-1839	DS-102	GP2L-102	PT621	IMP6-D1	330321	
C83	.1	900	22-1777	DF-104		PT401	IMP2-P1	330901	
C84	680	500	22-2135					KR-1368	
C85	.0015	600	22-1785	DS-152	GP2L-152	PT6215	IMP6-D1	3306215	
C86	1000	500	22-2163			MC8255		KR-1310	
C87	100		22-2598	DD-102	501-001	DC-521		K-1210	
C88	680		22-2367	DS-681	GP2K-681	UC-5368		K-1368	
C89	330		22-2309	DS-331	GP2K-331	UC-5333		K-1333	
C90	.0047	400	22-1783	DS-472	GP2-333-472	PT6347	IMP6-D47	330425	
C91	.15	600	22-2341						
C92	.1	600	22-2340						
C93	.0015	600	22-2586			MC8256		CR-1315	
C94	75	3000							

Note 1. Some versions use 4MFD in this application.
Note 2. Not used in some versions.

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	ZENITH PART No	IRC PART No	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
			REPLACEMENT DATA					
R1A	1Meg	½	63-3225	QI3-137	A4Y-1Meg-Z	B-70-S	U-53	Volume
B	Shaft		Not Req.	Not Req.	FS-2	Not Req.	Not Req.	Attach to R1A
C	Sw. Cover		Not Req.	Not Req.	KS-5	Not Req.	Not Req.	Attach to R1A
D	Switch		Not Req.	76-1	SWE-13	Not Req.	UB-36	Attach to R1A
R2A	10Meg with 1Meg stop	½	63-3946	QII-143	A4Y-10Meg-S	AB-96	U-52	Height - Note 1
B	Shaft		Not Req.	RQ	FKB-1/4	AK-1	Not Req.	Attach to R2A
R3A	200KΩ	½	63-2837	QII-129	A4Y-200K-S	AB-46	U-43	Brightness
B	Shaft		Not Req.	Not Req.	KS8-5	AK-4	Not Req.	Attach to R3A
R4A	15KΩ	½	63-3076	QII-119	A4Y-15K-S	AB-20	U-36	AGC
B	Shaft		Not Req.	RQ	FKB-1/4	AK-1	Not Req.	Attach to R4A
R5A	75KΩ	½	63-3222	QII-125	A4Y-75K-S	AB-35	U-41	Vert. Hold
B	Shaft		Not Req.	Not Req.	KS8-5	AK-4	Not Req.	Attach to R5A
R6A	1500Ω	½	63-2865	WX-1500	A4Y-1500-S	AB-6	BU-6	Vert. Linearity
B	Shaft		Not Req.	Not Req.	FKB-1/4	AK-1	Not Req.	Attach to R6A
R7A	5000Ω	4	63-3201		A1G-5000	SVP-999	M8MPK	Contrast (Wire wound)
B	Shaft		Not Req.		RS-2	Not Req.	Not Req.	Attach to R7A
R8A	1Meg	½	63-3224	*QJ-625		F1-53	UF161. ①	Bass - Panel
B	250KΩ	½				RJ-35	UN256A. ①	Treble - Rear
C	Spring					RS-1	Not Req.	Attach to R8A
R9	600Ω	½	63-3167		39-600			Buzz (Wire wound)
R10A	1.5Meg	½	63-3919	QII-142	A4Y-1.5Meg-S	AB-96	U-52	Fringe Lock
B	Shaft		Not Req.	RQ	FKB-1/4	AK-1	Not Req.	Attach to R10A

† Universal replacement (Mallory exact duplicate part no. UK-1567)
* CONCENTRIKIT EQUIVALENT: KIT K-2, BASE ELEMENTS & SHAFTS: B17-137 & P1-126 (PANEL)
B13-130 & R7-208 (REAR)

Note 1: Connect a 1Meg resistor in series with the right-hand terminal of the control and the lead connecting to the same terminal of the original control. (Control viewed from shaft end, terminals down.)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	ZENITH PART No	IRC PART No.	NOTES
			REPLACEMENT DATA		
R11	47KΩ	½	63-1856	BTS-47K	
R12	470KΩ	½	63-1847	BTS-470K	Note 1
R13	22KΩ	½		BTS-22K	
R14	470Ω	1	63-1729		
R15	100KΩ	½	63-1869	BTS-100K	
R16	470MΩ	½	63-1821	BTS-470M	
R17	47KΩ	½	63-1772	BTS-470	
R18	220Ω	½	63-1758	BTS-220	
R19	100KΩ	½	63-1739	BTS-100K	
R20	68KΩ	½	63-1862	BTS-68K	
R21	100KΩ	½	63-1869	BTS-100K	
R22	82KΩ	½	63-1866	BTS-82K	
R23	10KΩ	½	63-1828	BTS-10K	
R24	220ΩΩ	½	63-1800	BTS-220Ω	
R25	10KΩ	2	63-3170	BTB-10K	
R26	22KΩ	½	63-1842	BTS-22K	
R27	2.2Meg	½	63-1926	BTS-2.2Meg	
R28	68Ω	½	63-1737	BTS-68	
R29	68Ω	½	63-1733	BTS-56	

ITEM No.	RATING OHMS	RATING WATT	ZENITH PART No	IRC PART No	NOTES
			REPLACEMENT DATA		
R30	180Ω	½	63-1754	BTS-180	
R31	390Ω	½	63-1772	BTS-390	
R32	27KΩ	½	63-1845	BTS-27K	
R33	150Ω	½	63-1768	BTS-150	
R34	6800Ω	½	63-1831	BTS-6800	
R35	12KΩ	½	63-1821	BTS-12K	
R36	120KΩ	½	63-1873	BTS-120K	
R37	120KΩ	½	63-1873	BTS-120K	
R38	390Ω	½		BTS-390	
R39	2700 5%	½	63-1760	BTS-270 5%	
R40	120Ω	½	63-1747	BTS-120	
R41	5600Ω	½	63-3233	BTS-5600	
R42	15KΩ	½	63-1834	BTS-15K	
R43	56Ω	½	63-1708	BTS-15	
R44	22KΩ	½	63-1566	BTB-22K	
R45	10Meg	½	63-1953	BTS-10Meg	
R46	100KΩ	½	63-1869	BTS-100K	
R47	100KΩ	½	63-1869	BTS-100K	
R48	33KΩ	½	63-1848	BTS-33K	

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	ZENITH PART No	IRC PART No	NOTES
			REPLACEMENT DATA		
R49	47KΩ	½	63-1855	BTS-47K	
R50	68KΩ	½	63-2320	BTA-68K	
R51	220KΩ	½	63-1884	BTS 220K	
R52	390KΩ	½	63-1801	BTS-390K	
R53	680KΩ	½	63-1904	BTS-680K	
R54	220KΩ	½	63-1884	BTS-220K	
R55	330KΩ	½	63-1894	BTS-330K	
R56	180KΩ	1	63-3213	BTA-180K	
R57	100KΩ	½	63-1870	BTS-100K	
R58	10KΩ	½	63-1827	BTS 10K	
R59	22KΩ	2	63-2141	BTB-22K	
R60	220KΩ	½	63-1883	BTS 220K	
R61	680KΩ	½	63-1904	BTS-680K	
R62	1000Ω	½	63-1788	BTS 1000	
R63	2200Ω	½	63-1799	BTS 2200	
R64	68KΩ	1		BTA 68K	
R65	68KΩ	½	63-1863	BTS-68K	
R66	1200Ω	½	63-1789	BTS-1200	
R67	68KΩ	½	63-1863	BTS-68K	
R68	68KΩ	½	63-1863	BTS-68K	
R69	100Ω	2	63-1973		
R70	12KΩ	½	63-1821	BTS-10K	
R71	150KΩ	1	63-1877	BTA-150K	
R72	82KΩ	½	63-1866	BTS-82K	
R73	270Ω	2			Note 3 & 4
R74	220Ω	3			Note 3 & 4
R75	2200Ω	½	63-1799	BTS-2200	
R76	10KΩ	½	63-1828	BTS-10K	
R77	470KΩ	½	63-1897	BTS-470K	
R78	47KΩ	2	63-2147	BTB-47K	
R79	470KΩ	½	63-1897	BTS-470K	
R80	100KΩ	½	63-1869	BTS-100K	
R81	56KΩ	½		BTS-56K	
R82	150KΩ	½	63-1876	BTS-150K	
R83	47KΩ	½	63-1855	BTS-47K	
R84	10KΩ	½	63-1828	BTS-10K	
R85	22KΩ	½	63-1841	BTS-22K	

ITEM No.	RATING OHMS	RATING WATT	ZENITH PART No.	IRC PART No.	NOTES
			REPLACEMENT DATA		
R86	100KΩ	½	63-1869	BTS-100K	
R87	100Ω	½	63-1744	BTS-100	
R88	1.8Meg	½	63-1922	BTS-1.8Meg	
R89	470Ω	½	63-3187	BTA-470	
R90	100Ω	½	63-1744	BTS-100	
R91	560Ω	½	63-1775	BTS-560	
R92	560Ω	½	63-1775	BTS-560	
R93	100KΩ	½	63-1870	BTS-100K	
R94	330Ω	½	63-2286	BTA-330	
R95	1Meg	½	63-1941	BTS-1Meg	
R96	1Meg	½	63 1941	BTS-1Meg	
R97	27KΩ	½	63-1845	BTS-27K	
R98	100Ω	½	63-1744	BTS 100	
R99	1Meg	½	63-1941	BTS-1Meg	
R100	47KΩ	½	63-1771	BTS-470	
R101	47KΩ	1	63 1194	BTA 47K	
R102	22KΩ	½	63-956	BTA-22K	
R103	22KΩ	½	63-1842	BTS-22K	
R104	10KΩ	2	63-3145	BTB-10K	
R105	1Meg	½	63-1941	BTS-47K	
R106	220KΩ	½	63-3194	BTA-220K	
R107	33KΩ	½	63-1848	BTS-33K	
R108	100Ω	½	63-1744	BTS-100	
R109	680KΩ	½	63-1905	BTS-680K	
R110	100Ω	½		BTS-100	Note 3
R111	12KΩ	2	63-1823	BTB-12K	
R112	12KΩ	1	63-958	BTA-12K	Note 5
R113	100Ω	2	63-1973		
R114	4700Ω	2	63-966	BTB-4700	
R115	4700Ω	2	63-966	BTB-4700	
R116	68KΩ	½	63-1863	BTS-68K	
R117	130KΩ	½	63-1873	BTS-130K	
R118	100KΩ	½	63-1870	BTS-100K	
R119	5.2Ω	2	63-2316		Note 2
R120	5.6Ω	½	63-3253		
R121	330Ω	½		BTS-330	

Note 1: Some versions may use a 470Ω resistor in this application.
Note 2: Not used in some versions.
Note 3: Some versions may use a 4700 7 watt resistor in this application.
Note 4: When replacing this resistor use original clamp or double wattage of replacement.
Note 5: Some versions may use a 22KΩ 1 watt resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	ZENITH PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
				REPLACEMENT DATA						
T1	117VAC ② 2.16A	530VCT 380ADC	5VAC ② 6A	26-1400						
	SEC. 3	SEC. 4	SEC. 5							
	13.6VCT ② 6.4A									

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	ZENITH PART No.	VIKING PART No.	QUAM PART No.	NOTES
				REPLACEMENT DATA			
SP1	10"	PM	3.8Ω	49-764		10A1023.2	① Use in Models R2387H, R2397RU,
SP2	5¼"	PM	11.8Ω	49-777 ①		3A15 T	R2391E and R2391EU
	5¼"	PM	3.8Ω	49-778 ①			② Used in Models R2387E, R2387H,
	7½"	PM	3.8Ω	49-779 ②	879	8A31	R2397EU and R2397RU

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	ZENITH PART No	Halldorson PART No	Merit PART No	RCA TYPE No	Rom PART No	Stancor PART No	Thordarson PART No	Triad PART No
		REPLACEMENT DATA							
T2	Horiz. Output Trans.	S-22130 ①							
T3	Vert. Output Trans.	26-1377	Z1802 ② ④	A-3038 ③ ⑤		V307P ③ ⑤	A-8149 ③	26872 ③ ⑤	A-10EX ③ ⑤
T4A	Yoke-Horiz. (33MΩ	26-1406 ⑤	DF902 ④	MDF-72 ④	21UD3 ④	V70P14/ ③ 42	DY-84 ⑤	T-7 ⑦	Y-17-1 ⑦
B	Vert. (41MΩ								
T5	Horiz. Lin. Coil (5.5MΩ)	S-18342 ⑥ 168-218 ⑥	RF800 ⑪	MWC-3 ⑪	20TR13A ⑫	20R13A ⑫	WC-7 ⑬	WC-18 ⑬ WC-34	WC-13 ⑪
T5A	Width (3.8-22MΩ)	S-18748 ⑥							
B	(4.5-2.4MΩ)	168-221 ⑥							

① Complete assembly includes: Winding and terminal assembly: Zenith Part #6-X2189
Tertiary winding and terminal assembly: Zenith part #6-X2171.
② Drill new mounting hole(s).
③ Connect as auto transformer.
④ Connect blue lead to plate, white and red leads to yoke. Cut green lead short and tape end.
⑤ Includes capacitor C84, resistors R91 and R92.
⑥ See instructions packed with unit pertaining to yoke damping network.
⑦ Connect horizontal damping network across terminals #3 and #7. Use original network if necessary.
⑧ Remove damping capacitor from terminals #1 and #3. Use original horizontal network if necessary.
⑨ Includes clip, Zenith part #16-236.
⑩ Iron core and spring for horizontal linearity coil assembly.
⑪ Drill new mounting hole or use original slider, clip and core.
⑫ Connect to terminals #3 or #4 and "CT".
⑬ Do not use tap.
⑭ Iron core and spring for width coil assembly.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	ZENITH PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
			REPLACEMENT DATA						
T7	8.8KΩ	3.8Ω	26-1396	A-1824	A-5-53X	21G11	22588 ①		① Drill one new mounting hole.

COILS (RF-IF)

ITEM No	USE	DC RES PRI.	DC RES SEC.	ZENITH PART No	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
				REPLACEMENT DATA				
L1A	Ant. Coil	00CT	0Ω	S-21712				Channel 2
B	Ant. Coil	00CT	0Ω	S-21713				Channel 3
C	Ant. Coil	00CT	0Ω	S-21714				Channel 4
D	Ant. Coil	00CT	0Ω	S-21715				Channel 5
E	Ant. Coil	00CT	0Ω	S-21716				Channel 6
F	Ant. Coil	00CT	0Ω	S-19947				Channel 7
G	Ant. Coil	00CT	0Ω	S-19948				Channel 8
H	Ant. Coil	00CT	0Ω	S-19949				Channel 9
I	Ant. Coil	00CT	0Ω	S-19950				Channel 10
J	Ant. Coil	00CT	0Ω	S-19951				Channel 11
K	Ant. Coil	00CT	0Ω	S-19952				Channel 12
L	Ant. Coil	00CT	0Ω	S-19953				Channel 13
L2	Fil. Choke	0Ω		20-391				
L3	Hsc. Coil	0Ω		20-431				
L4	RF Coil	0Ω		20-537				
L4A	RF, Mixer Grid & Osc. Coils	0Ω		S-21703				Channel 2
B	RF, Mixer Grid & Osc. Coils	0Ω		S-21703				Channel 3
C	RF, Mixer Grid & Osc. Coils	0Ω		S-19954				Channel 4
D	RF, Mixer Grid & Osc. Coils	0Ω		S-19955				Channel 5
E	RF, Mixer Grid & Osc. Coils	0Ω		S-19956				Channel 6
F	RF, Mixer Grid & Osc. Coils	0Ω		S-19957				Channel 7
G	RF, Mixer Grid & Osc. Coils	0Ω		S-19958				Channel 8
H	RF, Mixer Grid & Osc. Coils	0Ω		S-19959				Channel 9
I	RF, Mixer Grid & Osc. Coils	0Ω		S-19960				Channel 10
J	RF, Mixer Grid & Osc. Coils	0Ω		S-19971				Channel 11
K	RF, Mixer Grid & Osc. Coils	0Ω		S-19972				Channel 12
L	RF, Mixer Grid & Osc. Coils	0Ω		S-19973				Channel 13
L5	Mixer Coil	0Ω		155-764				
L7	Mixer Grid Coil	0Ω		20-539				
L8	Osc. Coil	0Ω		20-541				
L9	IF Coil	.4Ω		S-18856				
L10	Conv. Plate	.1Ω		S-20903				Tapped at 0Ω
L11	47.25MC trap	0Ω		S-21718		17-4502*	5226	
L12	45.75MC trap	0Ω		S-21719		17-4501*	6236	
L13	1st Video IF	.1Ω		S-21019			6232	Includes 4L 25MC trap
L14	2nd Video IF	.1Ω	.1Ω	S-17907			6232a	
L15	3rd Video IF	.1Ω	.1Ω	S-19953			6233a	
L16	4th Video IF	.3Ω		S-20523				
L17	Series Peaking Coil	5.5Ω		S-17912	19-3160	TV-154	4644	145 Microhenries
L18	Shunt Peaking Coil	5.5Ω		S-21562	19-3160a	TV-154a	4644a	160 Microhenries; Wound in series with 2700Ω resistor
L19	Series Peaking Coil	.9Ω		S-21886	19-1904		4660	6.7 Microhenries
L20	4.5MC trap	13Ω	1.5Ω	S-21492				
L21	Series Peaking Coil	5.3Ω		S-21563	19-3153†		6153†	136 Microhenries; Wound on 5.6KΩ resistor
L22	Sound IF	.3Ω	.3Ω	S-20219	19-2445			
L23	Quadrature Coil	4.8Ω		S-19080	20-1004=	TV-18L=	1670=	
L24	Horiz. Osc.	153Ω		S-19743	19-1577			Tapped at 63Ω
L25	RF Choke	0Ω		20-529				5.5 Microhenries
L26	RF Choke	0Ω		20-528				5.5 Microhenries

* Use trap winding only.
= Detune trap.
▲ Series with a 5.6KΩ resistor.
† Parallel with a 5.6KΩ resistor.
■ Drill mounting hole.

ZENITH MODELS R2337 E, EU, R, RU, R2339E, EU, R, RU, R2356R, RU, R2367E, EU, T, TU, R2387R, RU, R3391E, EU (Ch. 22R20, U)

PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	ZENITH PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L27	.380A	46.5Ω	2.74HY	95-1399					

FUSES

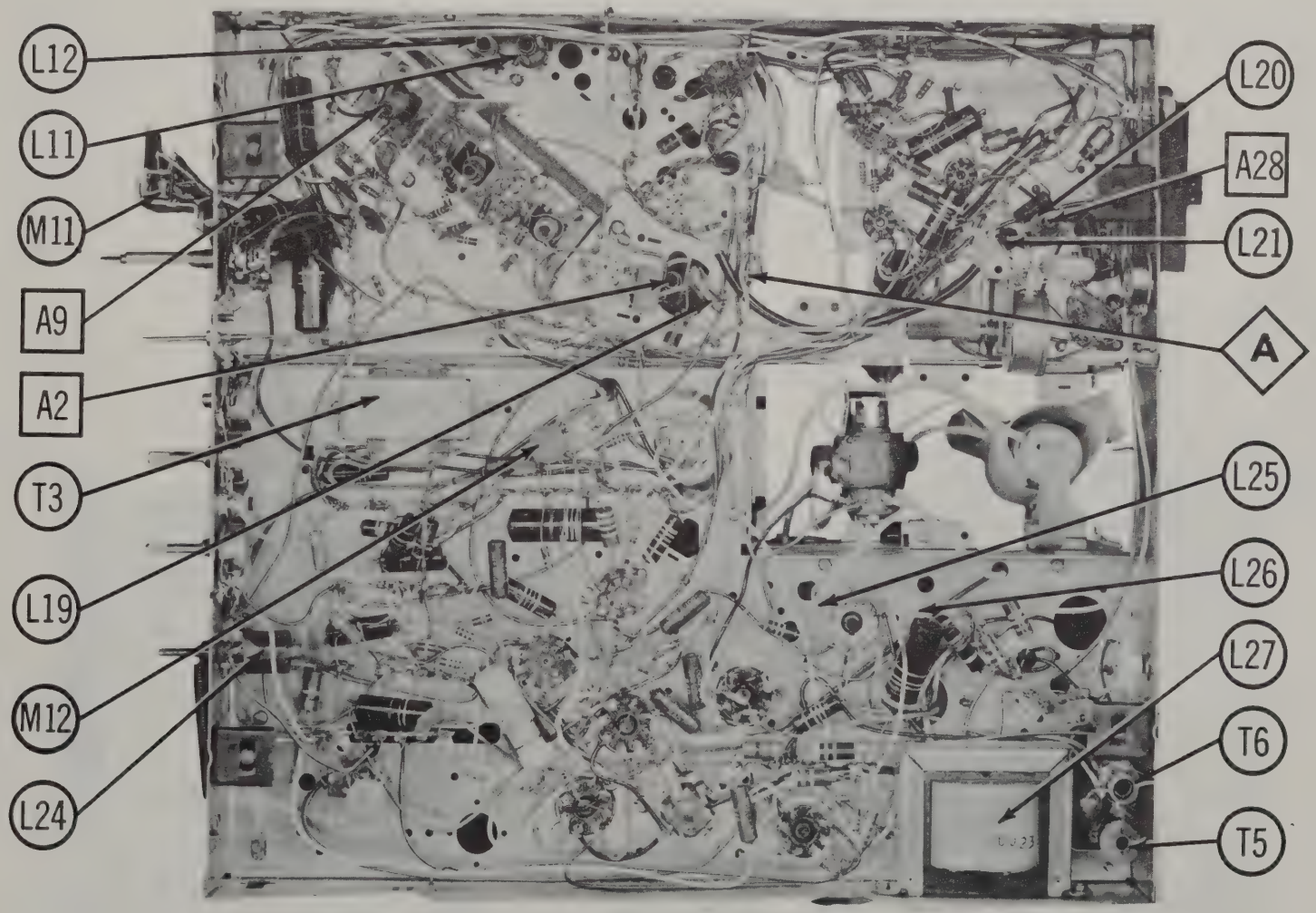
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			ZENITH PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	1/4A 125V	136-22	83-1883	313.250 (3AG-S/B-1/4A)	357001	MDL 1/4	4405

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		ZENITH PART No.	SYLVANIA PART No.		
M2	CK706A	103-1	1N60 or 1N132		Video Det.

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M3	Pilot Light	100-66	Type PR12 - Used in chassis 22R20 only.
M4	Pilot Light	100-67	UHF Position of Turret - Chassis 22R20U
M5	Pilot Light	100-67	All Positions of Turret - Chassis 22R20U
M6A	Tuner	S-21735	VHF-UHF (For UHF Provision, use UHF Strips) Chassis 22R20
B	Tuner	S-21700	VHF - Chassis 22R20U
M7	Tuner	S-21864	UHF - Chassis 22R20U
M8	Trap		VHF Ant. Input Filter
M9	Video Det. Ass'y.	S-21686	Includes M2, C40, C41, L17 and L18
M10	Switch	85-546	VHF-UHF - Used in Chassis 22R20U
M11	Switch	S-21831	TV-Phono-Slide
M12	Integrator	87-1	Vertical
M13	Focus Magnet	S-20377	Includes Centering Device
M14	Ion Trap	S-17461	
M15	Correction Magnet	S-18763	
M16	Correction Magnet	S-18763	
B1	Trimmer Cap.	22-2398	Horiz. Drive
	Cabinet	14-1762E	Models R2337E, EU
	Cabinet	14-1762R	Models R2337R, RU
	Cabinet	14-1743E	Models R2359E, EU
	Cabinet	14-1743R	Models R2359R, RU
	Cabinet	14-1752R	Models R2360R, RU
	Cabinet	14-1755E	Models R2367E, EU
	Cabinet	14-1755Y	Models R2367Y, YU
	Cabinet	14-1747R	Models R2368R, RU
	Cabinet	14-1760R	Models R2387R, RU
	Cabinet	14-1761E	Models R2391E, EU
	Knob Assembly	S-21883	VHF Channel Selector - All Models
	Knob	46-1018	Tone (Bass) - All Models
	Knob	46-1055	Tone (Treble) - All Models
	Knob	46-1118	Horiz. Hold - All Models
	Knob	46-1182	Vert. Hold & Brightness - Models R2237E, R, EU, RU; R2360R, RU; R2367E, Y, EU, YU; R2368R, RU; R2387R, RU;and R2391E, EU.
	Knob	46-1005	Vert. Hold & Brightness - Models R2359E, R, EU, RU.
	Knob	46-1199	Contrast - All Models
	Knob	46-1335	On-Off-Volume - All Models
	Knob	S-22048	Dial (UHF) - Models R2337EU, RU; R2360RU; R2367EU, YU; R2387RU; R2391EU and R2368RU
	Knob	S-22025	Dial (UHF) - Models R2359EU, RU
	Knob	S-22024	Tuning (UHF) - All UHF Models
	Knob	46-1355	Fine Tuning - All Models
	Safety Glass	192-190	Models R2337E, R, EU, RU; R2360R, RU; R2367E, Y, EU, YU; R2368R, RU; R2387R, RU and R2391E, EU.
	Safety Glass	192-189	Models R2359E, R, EU, RU.
	Mask	196-257	Models R2337E, R, EU, RU; R2360R, RU; R2367E, Y, EU, YU; R2368R, RU; R2387R, RU.
	Mask	196-256	Models R2359E, R, EU, RU.
	Mask	196-253	Models R2391E, EU.



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

TROUBLE SHOOTING AIDS (cont)

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V15, V16, V17, V18 and V19. Check M1 fuse. Check waveform W15.

If Satisfactory	If Unsatisfactory
Check T2, T4A, T5, T6, C91, C92, C90, R111, R112 and other associated components.	Check L24, C86, C85, C84, C87, C89, R101, R106, R104 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V16, V17, V18, V20 and V21. Check C89, R111, R112 and other associated components. Check adjustments B1 and B3.

BLOOMING

Check by substitution V17, V18, V19, V20 and V21. Check R111, R112, C89, C93 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5, V6 and V7. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

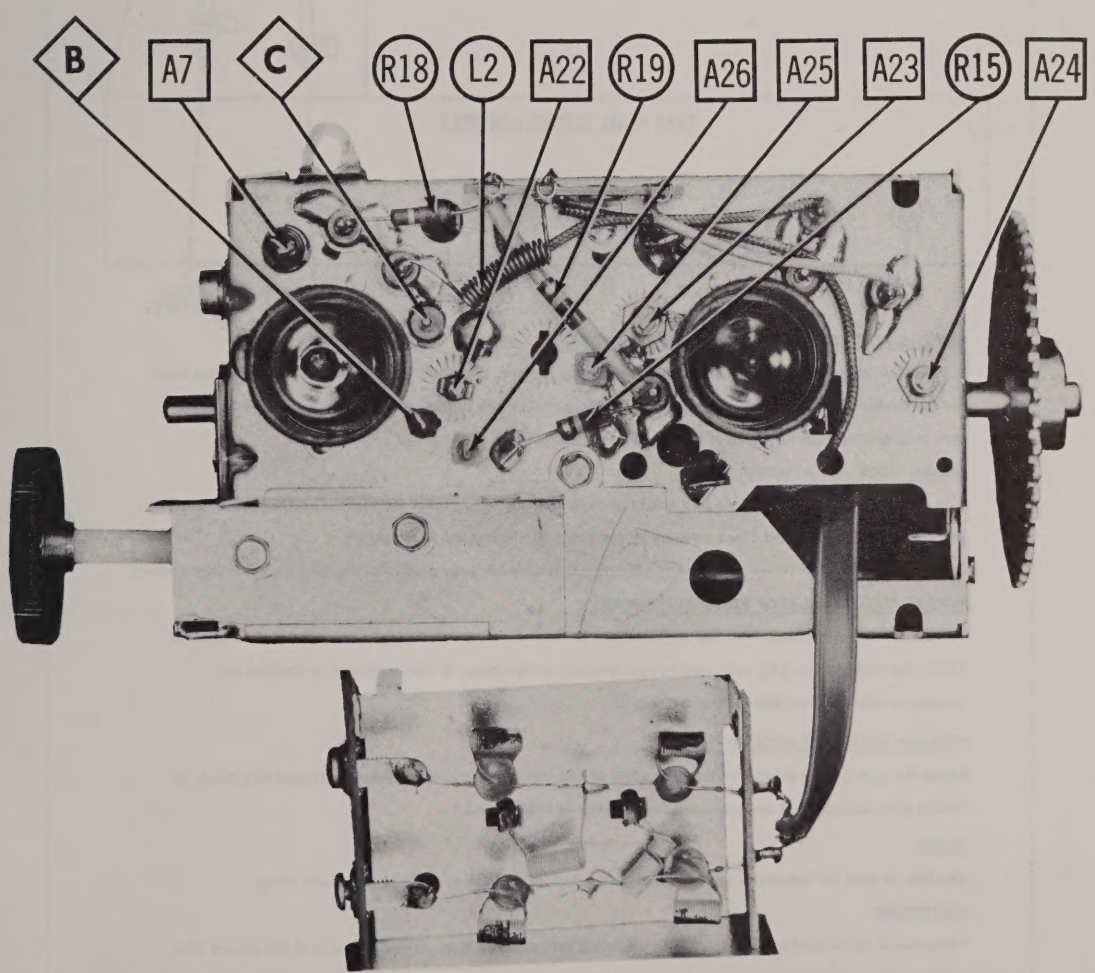
KEYSTONE EFFECT

Check T4 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



RF TUNER TOP VIEW

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

For touch-up adjustment of the VHF tuner oscillator circuit, it is necessary to remove rear cover and supply power to set. Adjustments are made thru the hole marked "Bull's Eye Adjustment" and are accessible one at a time as the selector switch is turned to each channel. (Fine tuning control must be set to the center of its range before making adjustments). Use Zenith alignment wrench part #68-21 for adjustment).

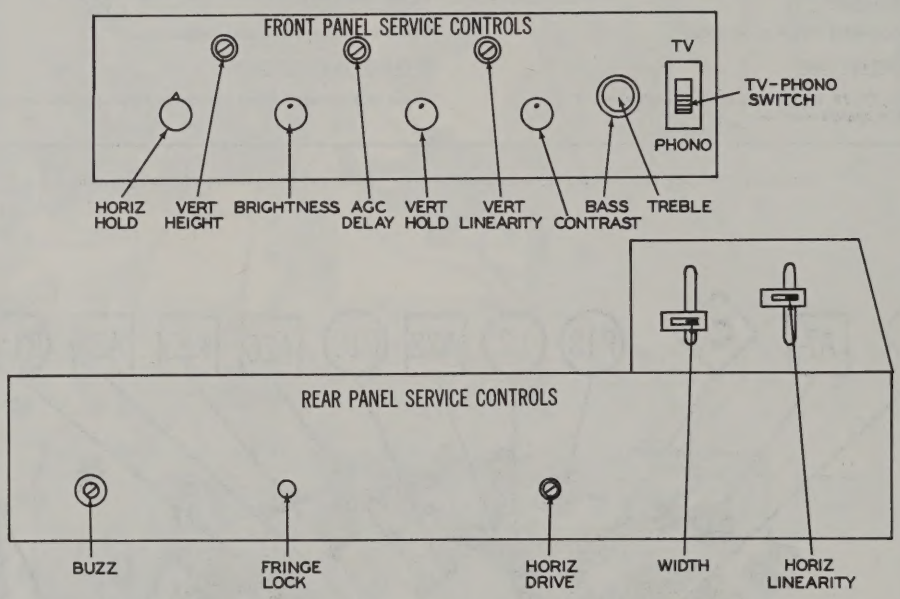
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 2 push-on type control knobs (channel selector and on-off volume). Remove 1 metal screw from each escutcheon panel. Remove escutcheon. Remove 2 wood screws from each safety glass clamp. Remove clamps. Let safety glass fall forward and lift out of slot at the bottom. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to reomve chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



SPECIAL ADJUSTMENTS - AGC DELAY ADJUSTMENT

Turn the set on and tune in a TV signal and observe the picture. Starting from the full clockwise position turn the AGC delay control counter clockwise slowly until picture distorts and buzz is heard in the sound. Then turn control clockwise for clearest picture and best sound.

FRINGE LOCK ADJUSTMENT

Turn the fringe lock control to 1/4 turn from full clockwise position. Adjust the vertical and horizontal hold for picture synchronization and check stability by switching off channel and back again.

SLIGHTLY retouch the fringe lock control adjustment, if necessary for maximum stability while testing as above.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the front panel service control. Adjust the horizontal hold control (L24) until picture synchronizes horizontally. If results cannot be obtained see horizontal sweep circuit adjustments on page 11.

SOUND IF DETECTOR BUZZ ADJUSTMENT

Adjust the buzz control located on the rear apron of the chassis for maximum volume and minimum buzz. If results are unsatisfactory see alignment instructions on pages 6 and 7.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

ANTI-PIN CUSHION ADJUSTMENT

Reduce the picture size so that the sides of the raster are visible, and position the magnets so that all sides are straight lines and the corners are at right angles.

DISASSEMBLY INSTRUCTIONS

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CHASSIS REMOVAL

1. Remove channel selector knob.
2. Remove 6 push-on type control knobs from under front control door.
3. Remove 8 wood screws. Remove fine tuning knob . Remove rear cover.
4. Remove shielded lead from tuner.
5. Remove volume control plug from chassis.
6. Remove 2 metal screws from rear of cabinet (holding tuner to cabinet) lower rear of tuner and pull out.
7. Disconnect B+ supply leads from tuner.
8. Disconnect 2 speaker leads.
9. Remove 4 chassis bolts. Remove chassis.

VOLUME CONTROL ASSEMBLY REMOVAL

1. Remove push-on type control knob.
2. Remove 1 metal screw from escutcheon panel. Remove panel.
3. Remove 1 control nut (outside cabinet).
4. Remove 1 metal screw from lead clamp (inside cabinet).
5. Remove lead clamp and control.

SPEAKER REMOVAL

1. Remove 6 speaker nuts from 2 speakers. Remove 2 speakers.